Reclaiming Our Health:

Exploring Chronic Conditions in Participating Northern Ontario First Nations

2003-2022

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Mamow Ahyamowen



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As a prescribed entity under Ontario's privacy legislation, ICES is authorized to collect and use health care data for the purposes of health system analysis, evaluation, and decision support. Secure access to these data is governed by policies and procedures that are approved by the Information and Privacy Commissioner of Ontario. Parts of this report are based on data and/or information compiled and provided by Canadian Institute for Health Information (CIHI), MOH, and Cancer Care Ontario (CCO). This report also used data adapted from the Statistics Canada Postal Code^{OM} Conversion File, which is based on data licensed from Canada Post Corporation, and/or data adapted from the Ontario Ministry of Health Postal Code Conversion File, which contains data copied under license from Canada Post Corporation and Statistics Canada.

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Maureen Gustafson
Yantao Zhao

Data Ownership

The data in this report is owned by the First Nations communities who gave consent to participate in this project, with Mamow Ahyamowen as the data steward.

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About Us

Mamow Ahyamowen is a health data alliance of eleven First Nations health and social services organizations based in Northern Ontario. Formed in 2016, our vision is to be a trusted Northern voice providing the health information that First Nations need to achieve health equity.

What does this look like on the ground? We work with member organizations and the communities they serve to find, analyze, and interpret data in response to questions that they have prioritized. We also work with them to share findings in ways that are meaningful and accessible. By doing this, we hope that organizations and communities can use the findings to work toward their goals.

Learn more about us and our work at mamowahyamowen.ca.

Member Organizations:

- Giishkaandago'Ikwe Health Services
- Independent First Nations Alliance (IFNA)
- Keewaytinook Okimakanak
- Kenora Chiefs Advisory
- Maamwesying North Shore Community Health Services
- Matawa First Nations Management
- Mushkegowuk Council
- Shibogama First Nations Council
- Sioux Lookout First Nations Health Authority (SLFNHA)
- Wabun Tribal Council
- Weeneebayko Area Health Authority (WAHA)

Preface

A Message from the Mamow Ahyamowen Steering Committee

Early on during our time together, Mamow Ahyamowen decided to explore indicators related to mortality so that we could better understand the wide range of health concerns affecting the communities we serve. This led to the publication of *Learning from Our Ancestors: Mortality Experience of First Nations in Northern Ontario* (1). When we came together to review the findings, we realized that they left us with just as many questions as they had answers; we needed to dig deeper.

One of the areas we wanted to explore more was chronic conditions. We all know that chronic conditions have a big impact on the wellbeing of community members. *Learning From Our Ancestors* helped us identify the chronic conditions that community members had when they passed away, as well as those that caused them to pass away. What we didn't know was how common those conditions were among the community members still with us.

With this report, we are starting to get answers to these questions. Some of the findings came as a surprise to us, while others corroborated what communities have been saying for a long time. This report is only the beginning. We will continue to share these findings in different ways so that our organizations and the communities we serve can use them to support health planning, advocacy, and fundraising. We also hope and expect that the report will encourage community leaders and members to ask questions that can guide our next steps.

As you read this report, we encourage you to keep in mind that behind each number is a person. They are children, cousins, parents, grandparents, aunties, uncles, friends, and community members. We see this report as one step in the journey to reclaim the wellbeing that our people have always known.

Miigwech,

Mamow Ahyamowen Steering Committee

Summary



Background

Chronic conditions are health problems that last a long time. The goal of this study was to find out how common chronic conditions are for Mamow Ahyamowen community members.

Methods



We used health administrative data, which are pieces of information collected in the health care system, to create this report. By linking this data with the Indian Register (IR), we calculated the prevalence and incidence of 22 chronic conditions from 2003-2022.

Prevalence is how many people were living with a condition at a point in time, no matter when they were diagnosed. Incidence is how many people were diagnosed with the condition during a period of time.



Findings

This report talks about the conditions we explored, how common they are compared to Ontario overall, how this has changed over time, and what this might mean. It also looks at how conditions affect different age groups and sexes. Here are some highlights:

Three of the 5 **most common conditions**[1] for community members were related to mental health and substance use:

1. Mood and anxiety disorders
2. Substance use disorder
3. Other mental health conditions
4. High blood pressure
5. Osteoarthritis



[1] Based on prevalence rates for 2019

How rates changed over time...[2]

For some conditions, we saw big *increases* in incidence and prevalence over time. This could mean that more community members are being diagnosed with the conditions, but that they are living longer or that fewer of them are passing away. For example, this was the case for:

- Cirrhosis
- Kidney failure
- Schizophrenia and other psychotic disorders

For a few conditions, we saw big *decreases* in both incidence and prevalence over time. This could mean that fewer community members are being diagnosed with the conditions, but that they aren't living as long or that more of them are passing away. For example, this was the case for:

- Chronic obstructuive pulmonary disease (COPD)
- Osteoporosis
- Congestive heart failure

[2] Based on the relative change for each condition between 2003 and 2022

How Mamow Ahyamowen compares to Ontario...[3]

The rates of some conditions were **much higher** for Mamow Ahyamowen **compared to Ontario** overall:



- Rheumatoid arthritis (14.4 times higher)
- Chronic pancreatitis (4.7 times higher)
- Substance use disorder (4.2 times higher)

How things break down within communities... [3]



Some conditions were **more common for female** community members, especially:

- Osteoporosis (2.6 times higher)
- Rheumatoid arthritis (3.7 times higher)



While one condition was **more common for male** community members:

- Heart attacks (almost 2 times higher)

For the most part, chronic conditions were **most common** in the **oldest age groups**. However, this was not the case for:

- Mental health and substance use conditions (most common in middle age groups, mostly 30-39 year olds)
- Asthma (most common in 20-29 year olds)

[3] Based on prevalence rates for 2019

Introduction

Chronic conditions are health problems that last a long time, often at least one year. People with chronic conditions generally need ongoing care from a doctor or other health care professionals and can experience symptoms that make it hard for them to do things they could do before. This means that chronic conditions can impact people's mental, emotional, spiritual, and physical wellbeing. Without ongoing care, people's symptoms can get worse. Chronic conditions can also lead to acute events like heart attacks. While these events are not chronic conditions themselves, they can have lasting impacts on people's wellbeing. It is also important to keep in mind that the impacts of chronic conditions can extend beyond the people living with them.

> The other piece is that these conditions impact more than just the individuals themselves, right? They do impact the individual, but they also impact their family, and particularly in First Nations communities… they impact that person's whole community. So helping people navigate their conditions does a lot more than just help one person.
>
> —Deirdre O'Sullivan Dromobolis, BScPT, MCISc, CFNHM
> Director, Home & Community Care
> Giishkaandago'Ikwe Health Services

In this report, we will explore some of the most common chronic conditions for Mamow Ahyamowen community members. For a list of the communities who participated in this project, see Appendix 1. There are many types of chronic conditions. We have grouped these conditions into categories to help organize the findings from this project (see Table 1).[1]

1 The conditions within some categories may be more closely related than others. We grouped conditions based on similarities in the systems and body parts they affect and how conditions relate to one another.

Table 1. Chronic conditions included in this report, organized by type

Condition Type	Conditions
Bone, joint, and connective tissue conditions	Osteoathritis
	Osteoporosis
	Rheumatoid arthritis
Cardiovascular conditions	High blood pressure
	Coronary artery disease
	Arrhythmia
	Congestive heart failure
	Stroke
	Heart attack
Respiratory conditions	Asthma
	Chronic obstructive pulmonary disease (COPD)
Cancer	
Mental health and substance use conditions	Mood and anxiety disorders
	Substance use disorder
	Schizophrenia and other psychotic disorders
	Other mental health conditions
Diabetes and related conditions	Diabetes
	Kidney failure
Dementia	
Gastrointestinal conditions	Chronic pancreatitis
	Cirrhosis
	Inflammatory bowel disease (Crohn's and colitis)

Methods

We used health administrative data to create this report. Administrative data are pieces of information collected in the health care system. Every time someone interacts with the health care system, information about the interaction is recorded in a database. There are different databases that hold information from different types of health care interactions. For example, if you go to the doctor in a publicly funded health care setting, the doctor records information about the purpose of your visit so that they can bill the Ontario Health Insurance Plan (OHIP). The visit and claims made by the doctor are captured in the OHIP database.

In Ontario, much of the publicly funded administrative health data are housed and maintained by a not-for-profit organization called ICES—formerly known as the Institute for Clinical Evaluative Sciences—as coded and linkable datasets. They can do this as a "prescribed entity" under Ontario's Personal Health Information Protection Act (PHIPA) and the Coroners Act. We worked with ICES to link health administrative data with population-based databases, such as the Indian Register (IR) maintained by Indigenous Services Canada and shared with ICES. Doing so allowed us to pinpoint members of participating Mamow Ahyamowen communities who had records in both the Indian Register and administrative health datasets, as shown in Figure 1. To learn about our inclusion and exclusion criteria, see Appendix 2. For information on the codes and definitions we used to produce these findings, see Appendix 3. For more information on the databases themselves, see Appendix 4.



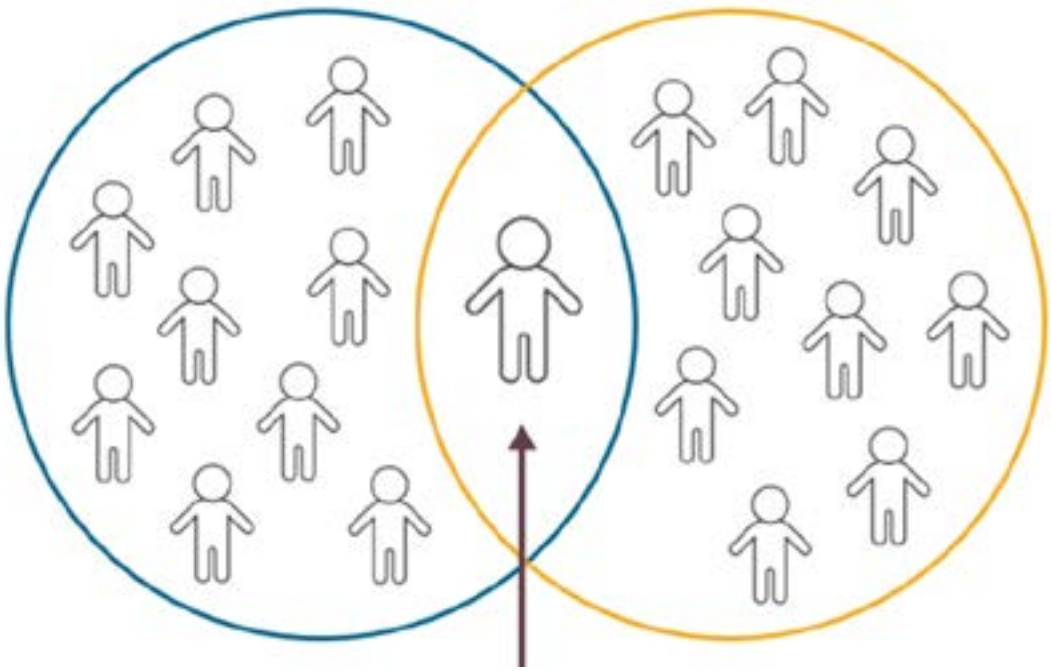
Figure 1. Venn diagram illustrating the data linkage process

Health Administrative Databases

Health claims and utilization data (e.g., doctors visits, lab results)

Indian Register (IR)

Demographic and administrative information on registered First Nations people



By linking these data together, we can learn more about the health of people from the communities we serve

There are policies and procedures that researchers have to follow to make sure they are accessing and using administrative data at ICES in a good way, especially when it comes to First Nations data. These policies and procedures allow researchers and their collaborators to learn more about how the health care system is performing and how it could be strengthened. To learn more about First Nations data at ICES, which is governed in collaboration with the Chiefs of Ontario, please visit ices.on.ca/indigenous/.

What we heard

Throughout the report, you'll see textboxes like this one. These textboxes will share information that we gathered at an event that we hosted in July 2024 to make sense of early findings from this project. Participants included members of the Mamow Ahyamowen Steering Committee, as well as other staff from member organizations.

By making sense of the findings together, we privileged the knowledge and lived experience of community members and those who work in community. This is an important part of Indigenous and decolonized quantitative research methods (2). The information contained in these textboxes provides suggestions that may begin to explain the findings in this report.



About This Report

This report is divided into sections that correspond with the condition types listed in Table 1. Please visit the sections that are of interest to you. Each section contains:

- General information about the condition type and the specific conditions we explored
- Findings around how common the conditions are in the Mamow Ahyamowen population compared to the Ontario overall population, how this has changed over time, and what this might mean (see Prevalence and Incidence)[2,3]
- Breakdowns exploring how the conditions affect Mamow Ahyamowen community members by age and sex[4,5,6]
- Suggestions for why these things may be happening based on what we heard from Steering Committee members and other staff from member organizations (see What We Heard)

The rates shared in this report are standardized, which means they take differences in the age and sex of populations into account. In an effort to take a more strengths-based approach and produce more useful findings, we used the 2019 Mamow Ahyamowen population as our reference population (see Appendix 5 for more information).

In some sections of the report, we compare the findings for Mamow Ahyamowen with Ontario overall to provide context. To see all the numbers for Ontario overall as well as Northern Ontario, please see the supplementary materials on our website at mamowahyamowen.ca.

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2 Descriptions of the changes within populations over time as well as comparisons between populations were developed based on the relative differences between rates.

3 The "So What?" sections include potential explanations for the trends we observed for both incidence and prevalence. While we include explanations related to survival (e.g., community members may be living longer), it is important to note that we did not specifically measure comparative survival in this project. These are presented only as possibilities.

4 Age and sex breakdowns are presented using data from 2019 because this was used as the reference year for standardization. The data from 2019 may also be a more accurate representation of typical distributions because it was not affected by the COVID-19 pandemic.

5 We couldn't break down findings by gender in addition to sex because these data aren't consistently collected in healthcare settings. We acknowledge that this focus on biological sex doesn't reflect the diversity of gender expression in participating communities.

6 The icons we used to visualize the breakdowns by sex have stick people wearing pants for men and dresses for women. While we used these symbols because they are widely recognized, we acknowledge that they lack nuance and reflect heteronormative beliefs about who should wear what.

You may notice that some numbers have been replaced with an asterisk (*) throughout the report. This means that we suppressed the number to protect the privacy of the people behind it. This happens when numbers are very small—typically 5 or less—and in situations when readers could use other numbers in the report to figure out these small numbers.

We've also included stories and insights from key informants including community members and staff from member organizations throughout the report. By doing so, we hope to offer a more meaningful and well-rounded picture of what's going on behind the numbers in Mamow Ahyamowen communities.

> It's the importance of hearing people's stories, their trauma, and all that matters to them. Attaching those stories to the data is crucial to understanding it and breaking it down. And numbers speak, I'm not discrediting that. Statistics are what get people's attention and prompt them to take action. When we report to funders, we need to include those numbers. They're so important; they just don't tell the whole story. You need to hear from people, from the community members, and from the workers first-hand—they're the ones in the thick of it, in the trenches of the trauma, hurt, and pain within our communities—because that's who is really impacted.
>
> —Tanya Hughes, HBA, HBSW, RSW, CFNHM
> Manager, Mental Health Services
> Giishkaandago'Ikwe Health Services

There are many ways you can use the information to help create change in your community. For example, you might use it to determine what type of programming or services would benefit your community, or to emphasize the need for funding in a proposal.

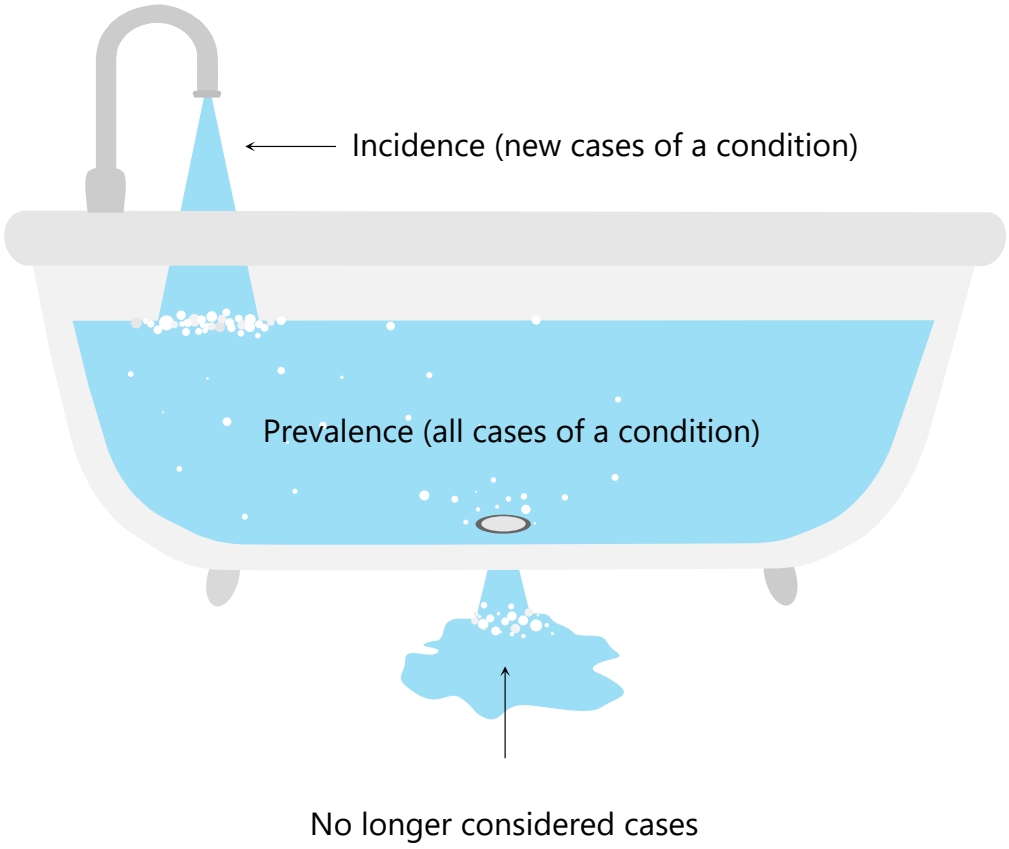
Please keep in mind that every type of data has strengths and limitations. To learn more about the strengths and limitations of the data contained in this report, see Appendix 5. One important limitation to keep in mind is that findings from 2020 onward might not be as accurate as preceding years. During the COVID-19 pandemic, many people were not able to access health care services, meaning they would not have been picked up in health administrative datasets.

Prevalence and Incidence

When thinking about how common conditions are in our population, we looked at two measures: prevalence and incidence. Prevalence tells us how many people are living with a condition at a specific point in time, regardless of when they were diagnosed, whereas incidence tells us how many people were newly diagnosed with a condition during a certain time period. Both measures, as well as the relationship between them, tell us something important.

Picture a bathtub (see Figure 2). The water level in the bathtub represents the community members who are living with a specific condition; this is prevalence. The running water coming from the faucet represents newly diagnosed cases of the condition; this is incidence, which contributes to the prevalence.

Figure 2. Illustration of bathtub analogy



The bathtub's water level is also affected by the drain. The water emptying through the drain represents community members who are no longer contributing to the prevalence. This can happen in one of three ways:

1. someone no longer has the condition because it went away on its own (e.g., the flu) or they were treated for it (e.g., skin rash)
2. someone with the condition passes away
3. someone with the condition isn't being counted anymore as they no longer meet the study's other inclusion criteria (e.g., they moved out of Ontario)

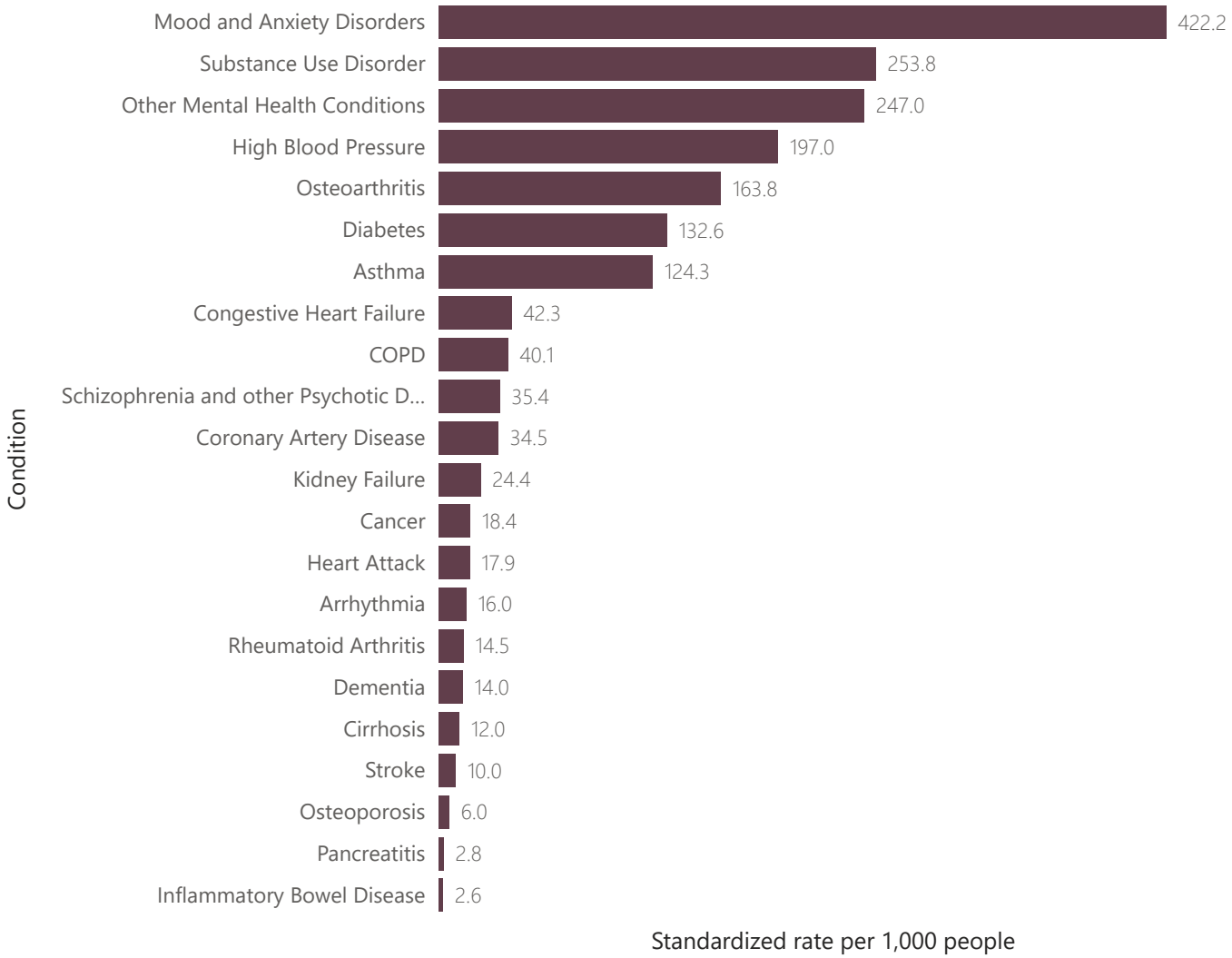
While scenario 1 might apply to the types of conditions mentioned above, many people diagnosed with a chronic condition will have that condition for life. So, in the context of this report, prevalence tends to decrease when people with a condition pass away or when they move out of Ontario. This means that increases in the prevalence of a condition could be a good thing because people with that condition are living with it for a long time rather than passing away shortly after being diagnosed. Increases in the incidence and prevalence of a condition could also be due to improvements in screening and diagnosis, which can be seen as positive. On the other hand, decreases in incidence or prevalence could be a reflection of people with the condition going undiagnosed.

As you can see, there are a lot of factors to consider when interpreting findings. Increases are not always bad, and decreases are not always good. When possible, we have included information to help with this process. Please keep this information in mind when looking at the findings on the following pages. You can always refer back to this page to help remind yourself of the difference between incidence and prevalence. We will continue to build on this analogy when discussing our findings.

Findings

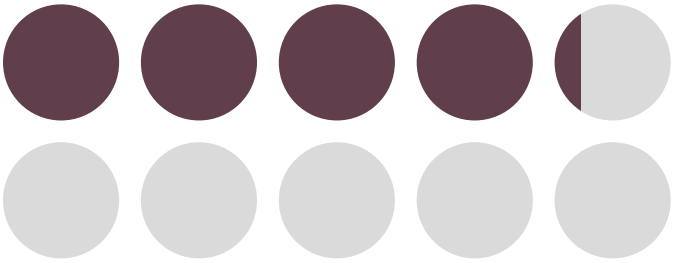
Three most common conditions for Mamow Ahyamowen were related to mental health and substance use

Graph 1. Chronic conditions by prevalence, Mamow Ahyamowen, 2019



In 2019, mood and anxiety disorders were the most prevalent chronic condition for Mamow Ahyamowen community members, at 422.2 cases per 1,000 people.

On average, this means that **just over 4 out of every 10** community members had experienced a **mood or anxiety disorder** at some point in their lives.



Inflammatory bowel disease was the least prevalent condition, at 2.6 cases per 1,000 people.

On average, this means that **fewer than 1 out of every 10** community members was living with **inflammatory bowel disease**.

As you read on, keep these findings in mind. While the prevalence and incidence of some conditions have changed dramatically over time, they might still be less common compared to other conditions.

However, it is also important to note that these findings don't tell us everything about a condition's impact. For example, **conditions with relatively low prevalence rates can still have serious impacts on the health and wellbeing of community members**. Prevalence and incidence rates are just one way that we can assess health and set priorities.



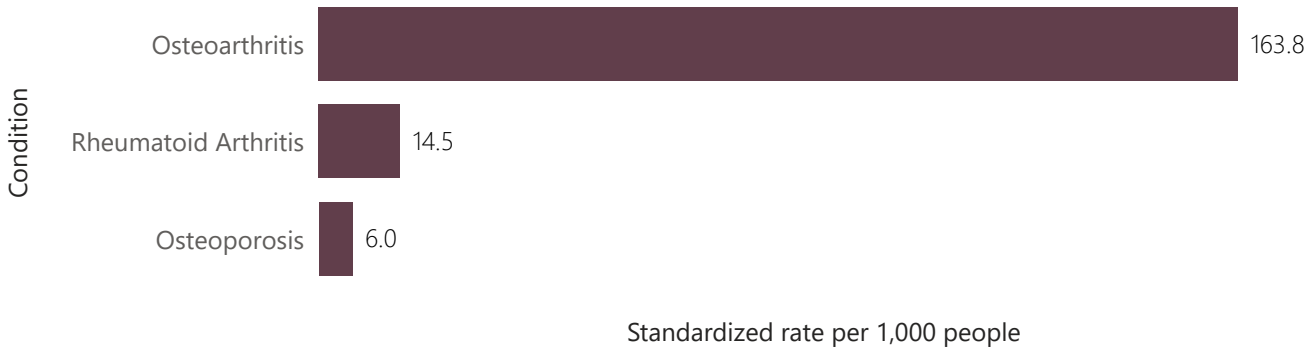
Bone, Joint, and Connective Tissue Conditions

Many of the conditions that we think of as affecting bones also affect joints and connective tissues. Joints are a place where two or more bones meet. Connective tissue is a broad term for groups of cells that support, connect, and protect other body parts. Some examples include tendons, ligaments, and cartilage.

Bones, joints, and connective tissues play many important roles in our bodies. They provide support, help us move, protect our organs, and store nutrients (3). This means that, in addition to causing pain, conditions that affect these body parts can have other serious impacts on our health and wellbeing. They can limit how we move, make it harder for us to do things by ourselves, and can even affect other body parts.

Osteoarthritis was most prevalent bone, joint, and connective tissue condition for Mamow Ahyamowen

Graph 2. Bone, joint, and connective tissue conditions by prevalence, Mamow Ahyamowen, 2019



Of all the bone, joint, and connective tissue conditions we looked at, osteoarthritis was the most prevalent for Mamow Ahyamowen community members in 2019, at 163.8 cases per 1,000 people. Relatively speaking, rheumatoid arthritis and osteoporosis were much less prevalent at 14.5 and 6.0 cases per 1,000 people, respectively.

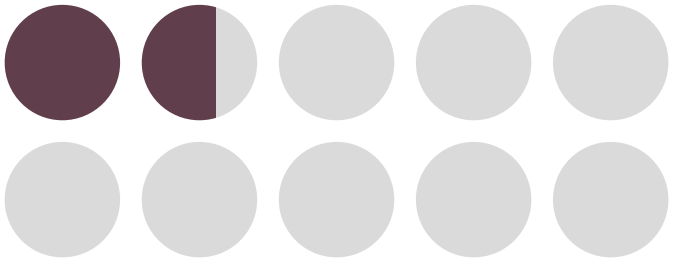


Osteoarthritis

Osteoarthritis is a chronic condition that causes damage to cartilage and other protective tissues that surround joints (4). The most common symptoms are pain, stiffness, and loss of function. This condition becomes more common as people age. While we refer to this category as "osteoarthritis" to keep things simple, please keep in mind that it also includes other, less common types of arthritis. It does not include rheumatoid arthritis, which is its own category.

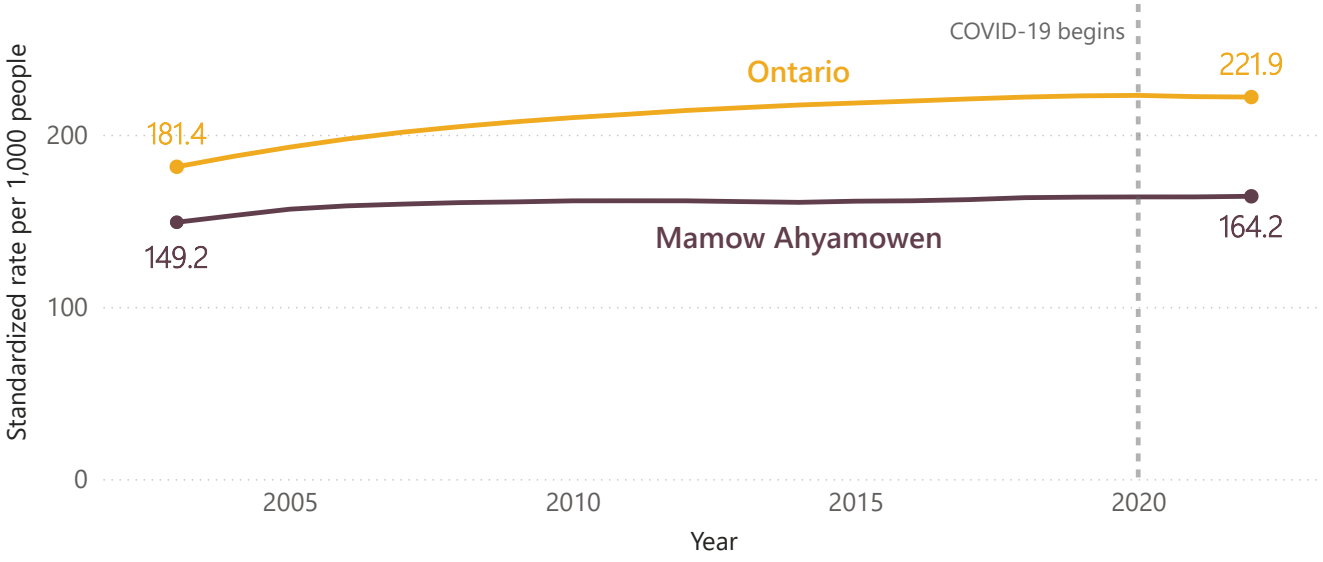
In 2019, the prevalence of osteoarthritis and other arthritis for Mamow Ahyamowen was 163.8 cases per 1,000 people.

On average, this means that **almost 2 out of every 10** community members were living with osteoarthritis.



Prevalence of osteoarthritis increased slightly for Mamow Ahyamowen

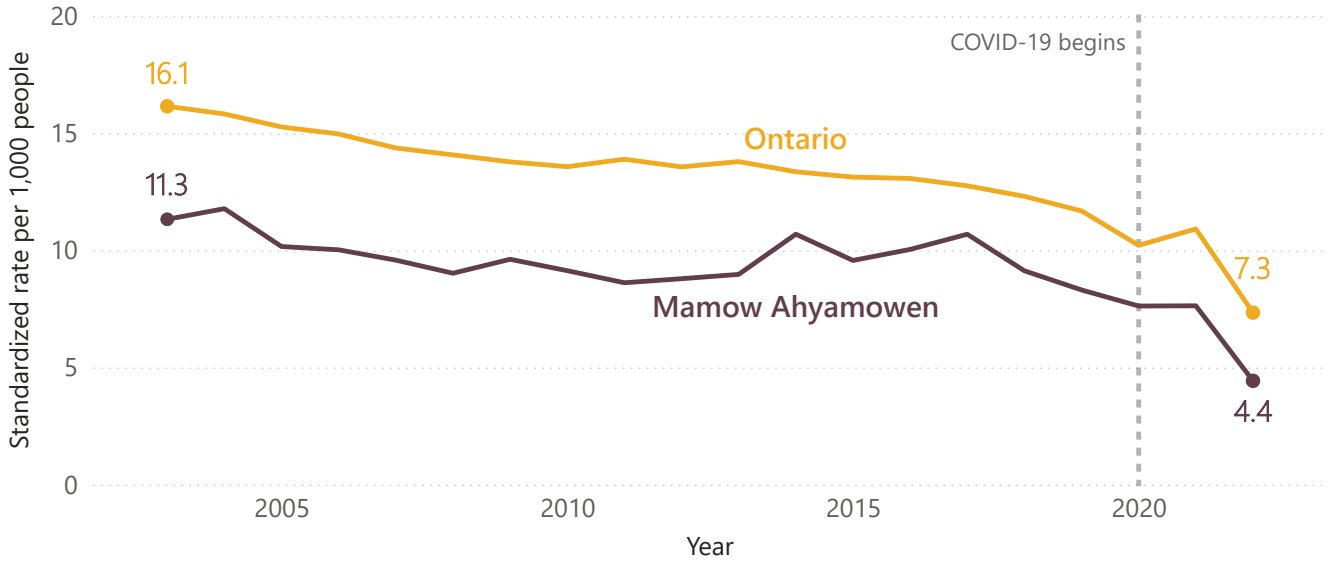
Graph 3. Prevalence of osteoarthritis over time, 2003-2022



The prevalence of osteoarthritis for Mamow Ahyamowen increased slightly from 149.2 cases per 1,000 people in 2003 to 164.2 per 1,000 people in 2022. The prevalence for Ontario overall was higher, increasing more quickly from 181.4 cases per 1,000 people in 2003 to 221.9 per 1,000 in 2022.

Incidence of osteoarthritis decreased dramatically for Mamow Ahyamowen

Graph 4. Incidence of osteoarthritis over time, 2003-2022



The incidence of osteoarthritis for Mamow Ahyamowen decreased dramatically from 11.3 new cases per 1,000 people in 2003 to 4.4 per 1,000 in 2022. The incidence for Ontario overall was higher but followed a similar pattern over time, decreasing dramatically from 16.1 new cases per 1,000 people in 2003 to 7.3 per 1,000 in 2022.

So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with osteoarthritis each year. Together with the increase in prevalence, this could mean that community members with osteoarthritis are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising even though there's less water flowing from the faucet. This could mean that less water is draining out of the tub.

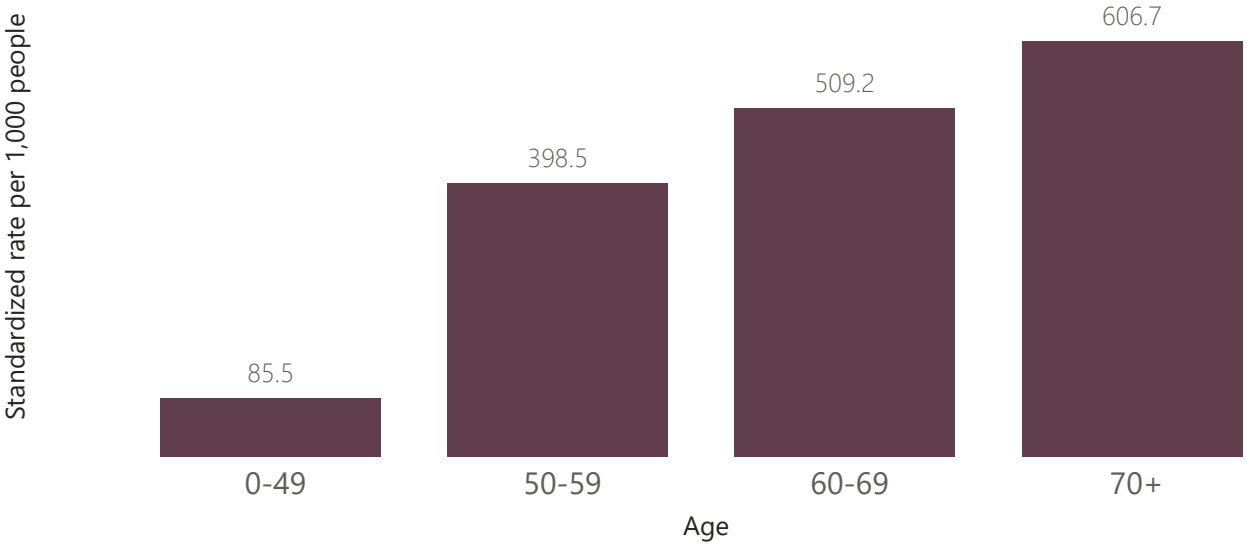
What We Heard

Event participants shared that these findings likely underestimate how many Mamow Ahyamowen community members had osteoarthritis. People with osteoarthritis often try to handle symptoms on their own for a long time, only seeking health care when the pain becomes unbearable. This is especially true in northern communities, where access to health care is limited. Many people with osteoarthritis also have other chronic conditions. Health care providers might be recording information about other conditions in the datasets we used instead of osteoarthritis.

The findings for osteoarthritis are more likely to have been impacted by the COVID-19 pandemic than some of the other conditions in this report because people often try to manage symptoms on their own. With all the public health restrictions put in place at the height of the COVID-19 pandemic, people may have been less likely to visit a health care provider for these symptoms. There were also changes to OHIP billing practices that may have impacted these findings. Starting in 2014, physiotherapists were no longer able to bill OHIP for treating patients with osteoarthritis, meaning that these visits would not have been picked up in the datasets we used.

Prevalence of osteoarthritis was highest for community members aged 70+

Graph 5. Prevalence of osteoarthritis by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of osteoarthritis in 2019 was highest for Mamow Ahyamowen community members aged 70 and older at 606.7 cases per 1,000 people. On average, this means that just over 6 out of every 10 community members in this age group were living with osteoarthritis as of 2019. This fits with what we know about osteoarthritis, which tends to become more common as people age (4).

When broken down by sex, the prevalence of osteoarthritis in 2019 was **higher for female community members** compared to males.



179.8 cases per 1,000

147.2 cases per 1,000



Osteoporosis

Osteoporosis is a chronic condition that decreases bone density (5). This means that bones become weaker and easier to break. Many people with osteoporosis do not know they have it until after they break a bone or are screened for the condition.

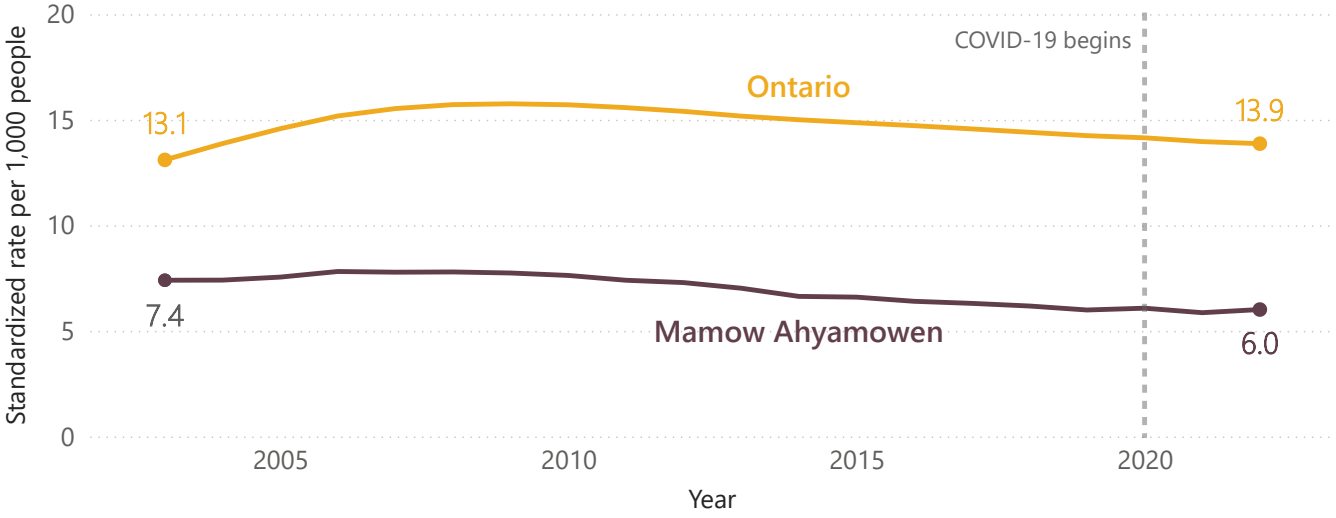
In 2019, the prevalence of osteoporosis for Mamow Ahyamowen was 6.0 cases per 1,000 people.

On average, this means that **fewer than 1 out of every 10** community members was living with osteoporosis.

While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of osteoporosis decreased slightly for Mamow Ahyamowen

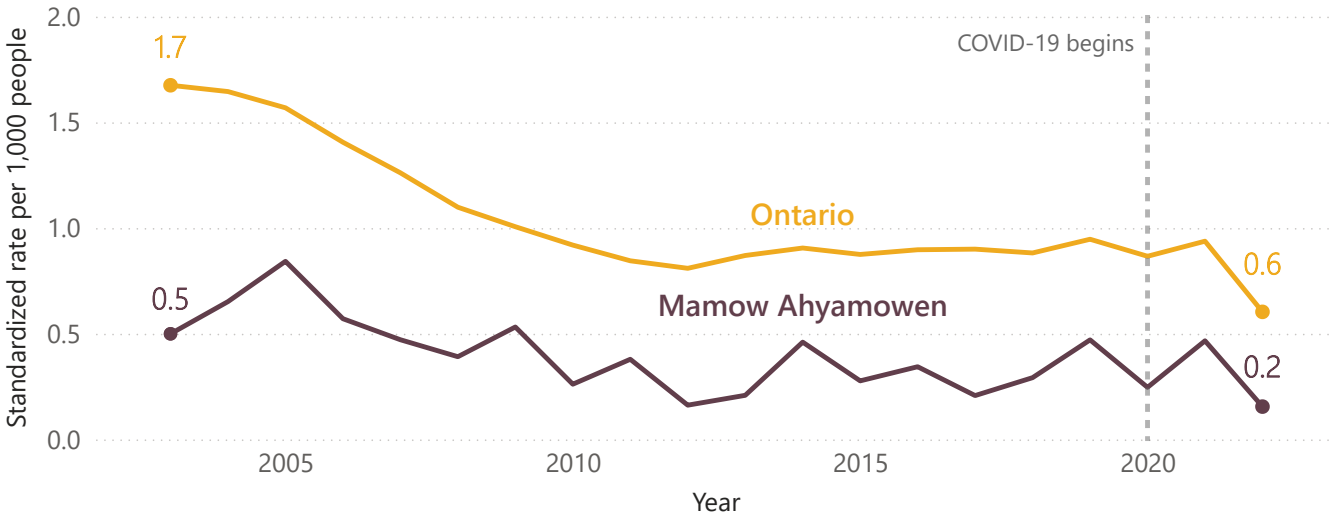
Graph 6. Prevalence of osteoporosis over time, 2003-2022



The prevalence of osteoporosis for Mamow Ahyamowen decreased slightly from 7.4 cases per 1,000 people in 2003 to 6.0 per 1,000 in 2022. The prevalence for Ontario overall was higher and followed a different pattern over time, increasing slightly from 13.1 cases per 1,000 people in 2003 to 13.9 per 1,000 people in 2022.

Incidence of osteoporosis decreased dramatically for Mamow Ahyamowen

Graph 7. Incidence of osteoporosis over time, 2003-2022



The incidence of osteoporosis for Mamow Ahyamowen decreased dramatically from 0.5 new cases per 1,000 in 2003 to 0.2 per 1,000 in 2022. There was some fluctuation in these rates over time. This is probably because the Mamow Ahyamowen population is relatively small, meaning that small changes in the number of people being diagnosed with this condition have a bigger impact. The incidence for Ontario overall was much higher, relatively speaking, but followed a similar pattern over time, decreasing dramatically from 1.7 new cases per 1,000 people to 0.6 per 1,000 in 2022.

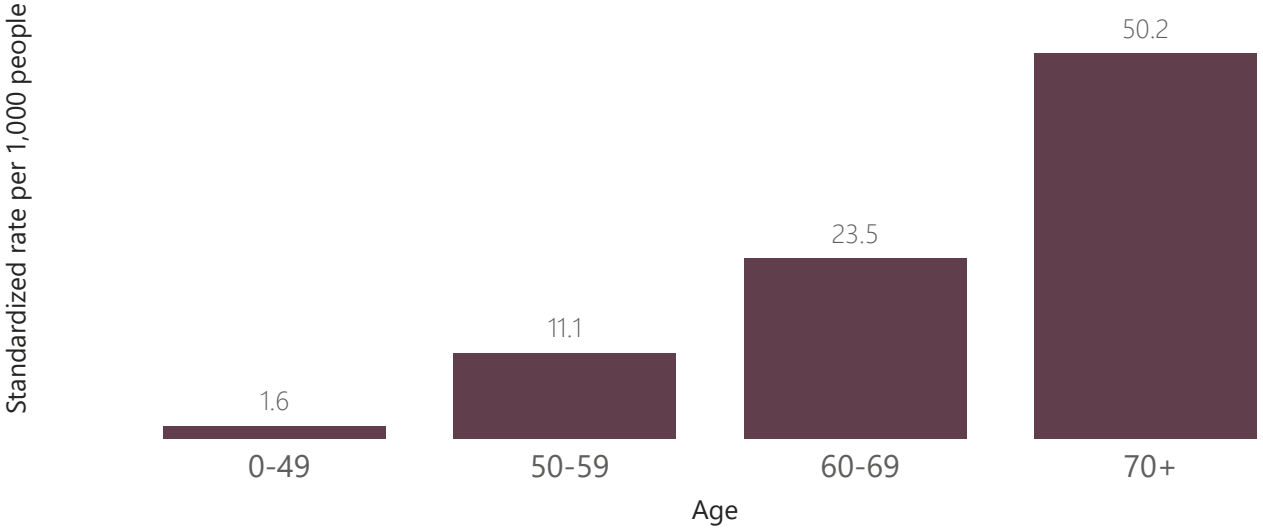
So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with osteoporosis each year. Based on the decrease in prevalence, it could also be that community members with osteoporosis aren't living as long or that more of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is slowly going down. We know that this is partly because less water is flowing from the faucet. It could also be that there is more water draining out of the tub.

Prevalence of osteoporosis was highest for community members aged 70+

Graph 8. Prevalence of osteoporosis by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of osteoporosis in 2019 was highest for Mamow Ahyamowen community members aged 70 and older, at 50.2 per 1,000 people. This fits with what we know about osteoporosis, which tends to become more common as people age.

When broken down by sex, the prevalence of osteoporosis in 2019 was **higher for female community members,** at 2.6 times the rate of males.

This fits with what we know about osteoporosis, which tends to be more common in women (5).



8.4 cases per 1,000

3.2 cases per 1,000

What We Heard

Event participants shared that these findings likely underestimate the incidence of osteoporosis for Mamow Ahyamowen community members. The most common way to detect osteoporosis is using a test called a Dual-Energy X-Ray Absorptiometry (DXA or DEXA) Scan. While the test is relatively simple, it requires specialized equipment that is not always available in remote communities. This might mean that people are not being screened or tested for osteoporosis when they should be. Furthermore, perimenopausal and menopausal women are at high risk of developing osteoporosis. In Mamow Ahyamowen communities, these women often act as caregivers for extended family. These responsibilities can make it hard for them to take care of themselves, which might mean they are less likely to seek the health care services that would help detect and diagnose osteoporosis.

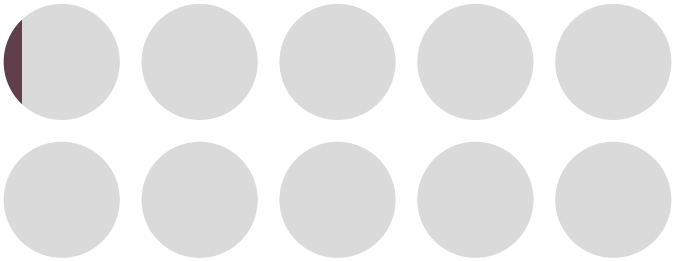


Rheumatoid Arthritis

Like osteoarthritis, rheumatoid arthritis affects joints and the protective tissues surrounding them. However, rheumatoid arthritis is an autoimmune condition (6). This means it is caused by problems in the immune system, which protects the body from invaders like bacteria and viruses. For people with rheumatoid arthritis, the body's immune system mistakenly attacks itself, causing inflammation that results in swelling, pain, and damage to joints.

In 2019, the prevalence of rheumatoid arthritis for Mamow Ahyamowen was 14.5 cases per 1,000 people.

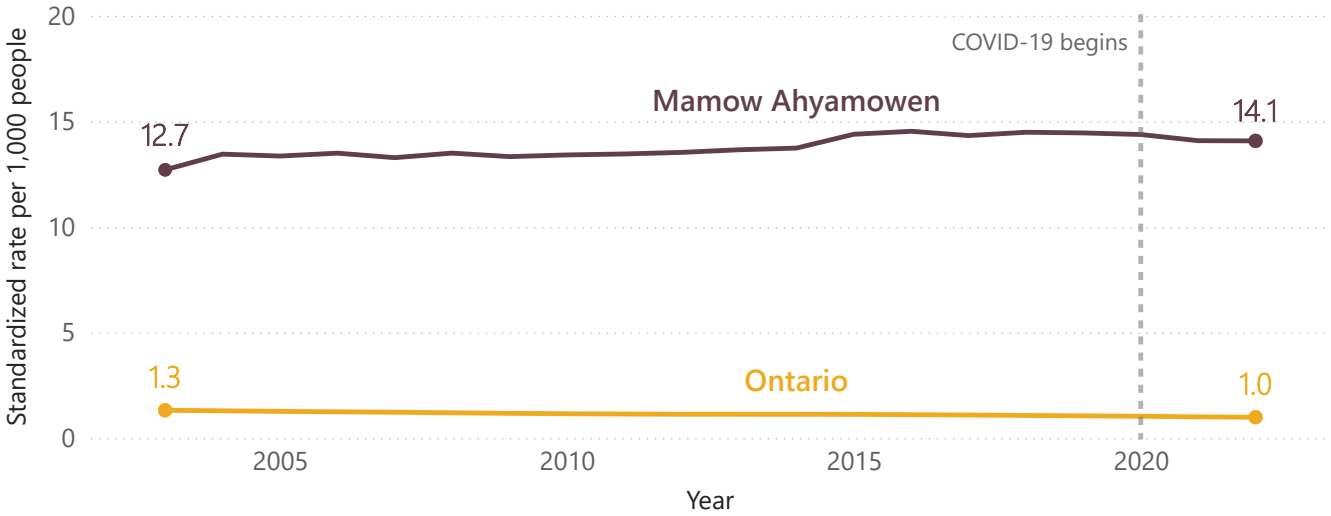
This means that **fewer than 1 out of every 10** community members was living with rheumatoid arthritis.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of rheumatoid arthritis increased slightly for Mamow Ahyamowen

Graph 9. Prevalence of rheumatoid arthritis over time, 2003-2022

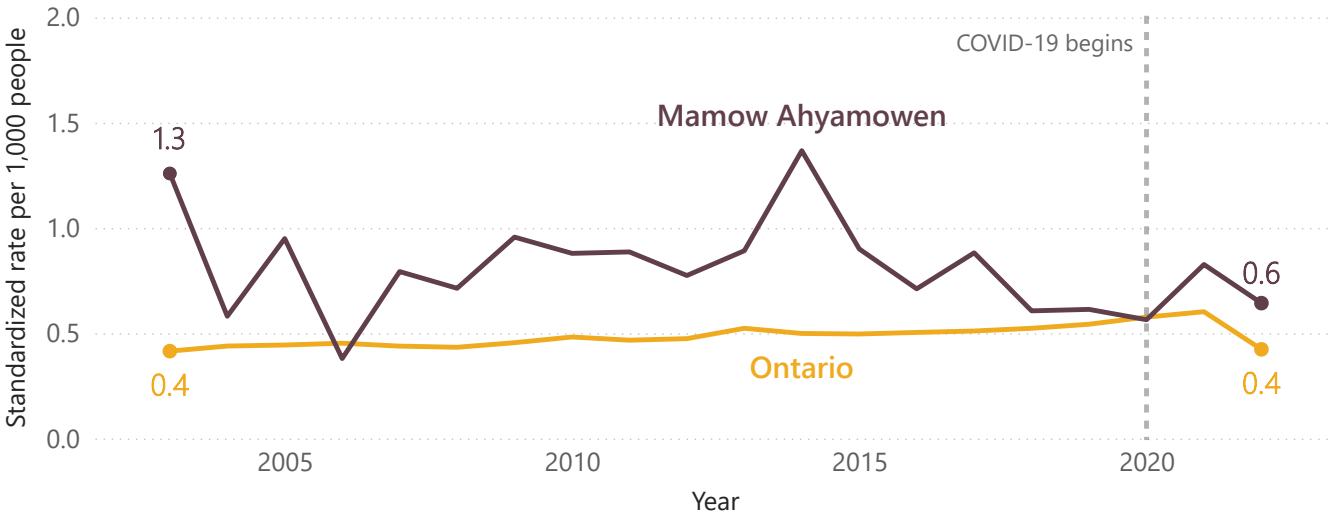


The prevalence of rheumatoid arthritis for Mamow Ahyamowen increased slightly from 12.7 cases per 1,000 people in 2003 to 14.1 per 1,000 in 2022.The prevalence for Ontario overall was much lower and followed a very different pattern over time, decreasing from 1.3 cases per 1,000 people in 2003 to 1.0 per 1,000 in 2022.

In 2022, the prevalence of rheumatoid arthritis for Mamow Ahyamowen was 14.1 times that of Ontario overall.

Incidence of rheumatoid arthritis decreased for Mamow Ahyamowen

Graph 10. Incidence of rheumatoid arthritis over time, 2003-2022



The incidence of rheumatoid arthritis for Mamow Ahyamowen decreased from 1.3 new cases per 1,000 people in 2003 to 0.6 per 1,000 in 2022. There was some fluctuation in these rates over time. This is probably because the Mamow Ahyamowen population is relatively small, meaning that small changes in the number of people being diagnosed with this condition have a bigger impact. The incidence for Ontario overall was lower and followed a different pattern over time, staying consistent at 0.4 new cases per 1,000 people in both 2003 and 2022.

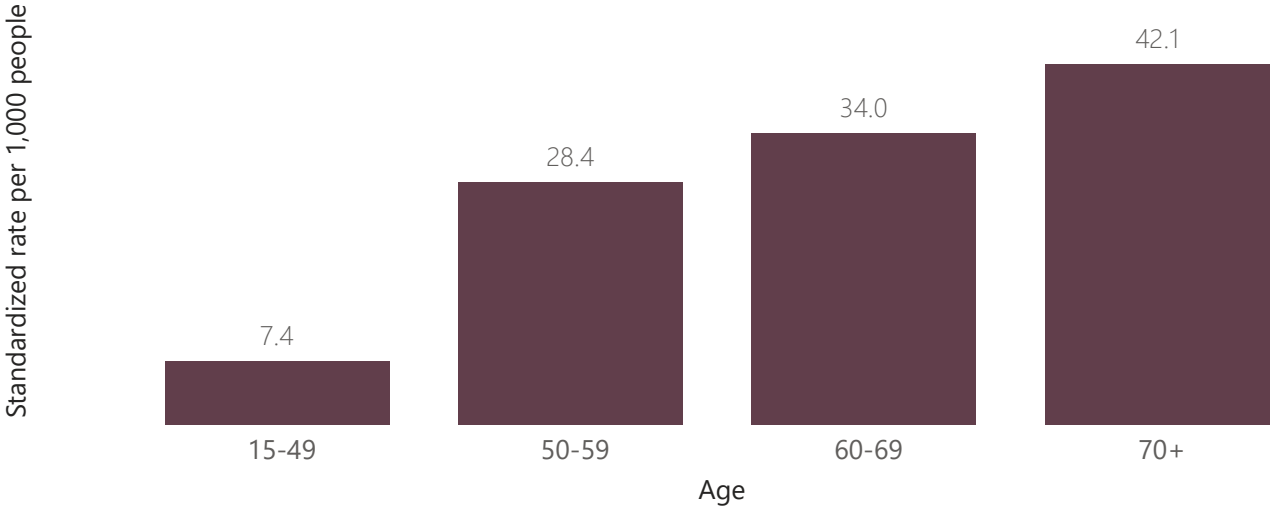
So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with rheumatoid arthritis each year. Together with the increase in prevalence, this could mean that community members with rheumatoid arthritis are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising even though there's less water flowing from the faucet. This could mean that less water is draining out of the tub.

Prevalence of rheumatoid arthritis was highest for community members aged 70+

Graph 11. Prevalence of rheumatoid arthritis by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of rheumatoid arthritis in 2019 was higher in the older age groups. The prevalence was highest for community members aged 70 and over, at 42.1 per 1,000 people.

When broken down by sex, the prevalence of rheumatoid arthritis in 2019 was **higher for female community members,** at 3.7 times the rate of males.

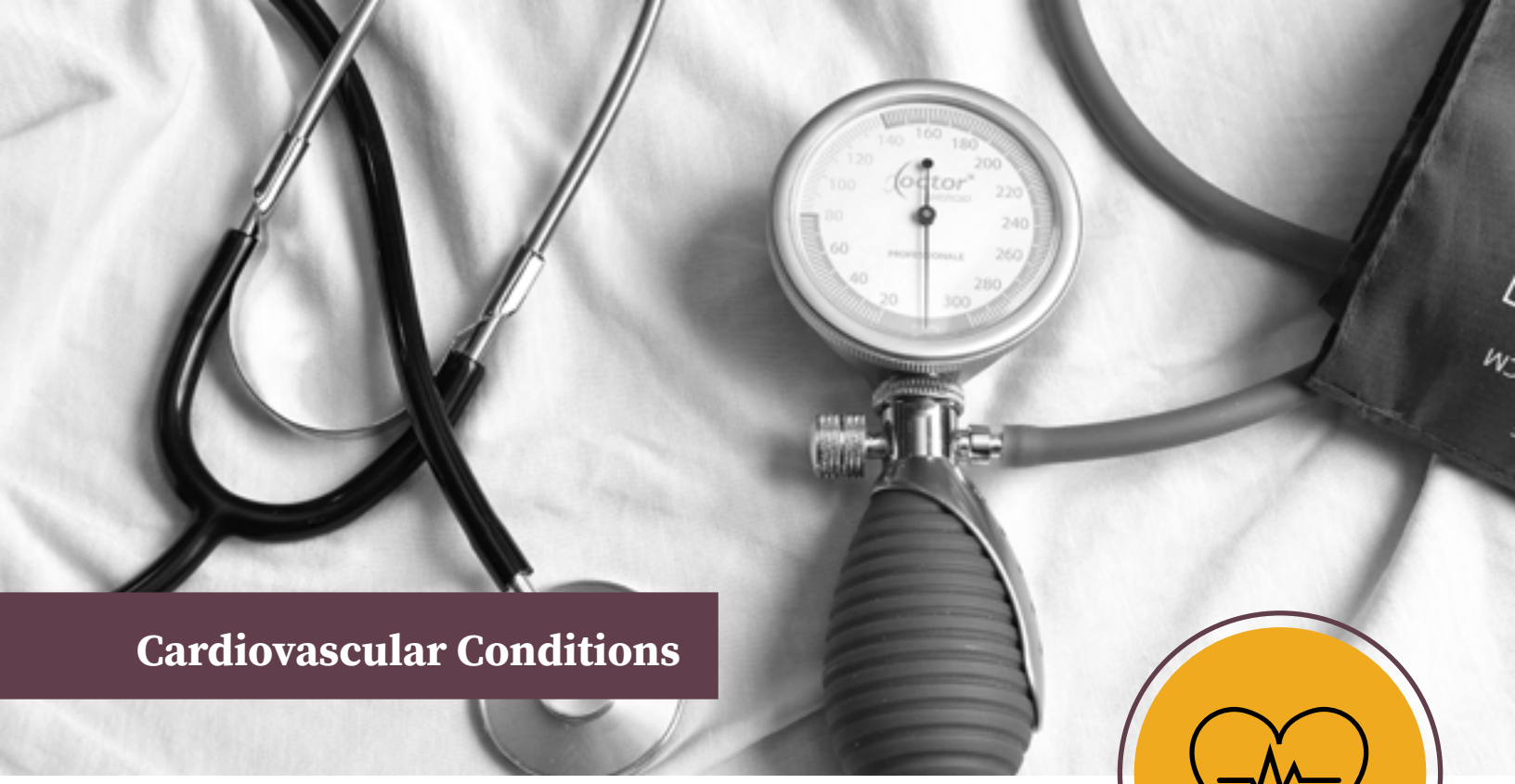


22.8 cases per 1,000 6.1 cases per 1,000

What We Heard

According to event participants, there are very few specialists who can diagnose rheumatoid arthritis in Thunder Bay, which is the main hub for health care in Northwestern Ontario. People are often referred to Manitoba for diagnosis and treatment, which leads to delays in receiving care. If someone is diagnosed with and treated for rheumatoid arthritis by a health care provider in Manitoba, they may not be included in the datasets we used for this report. This means that our findings could undercount the incidence of rheumatoid arthritis for Mamow Ahyamowen community members, particularly in the northwest.

One leader we spoke with noted that people in the communities served by their organization had been noticing high rates of rheumatoid arthritis among their people for a long time. They wondered whether the presence of environmental pollutants in their territory could be contributing to this. Research has shown that rheumatoid arthritis is probably caused by a mix of genetic, hormonal, and environmental factors (7). There is also a growing number of studies that suggest a link between rheumatoid arthritis and air pollution, including that caused by wildfire smoke (8-11). This potential link is especially concerning given that First Nations communities are disproportionately impacted by such factors due to environmental racism.

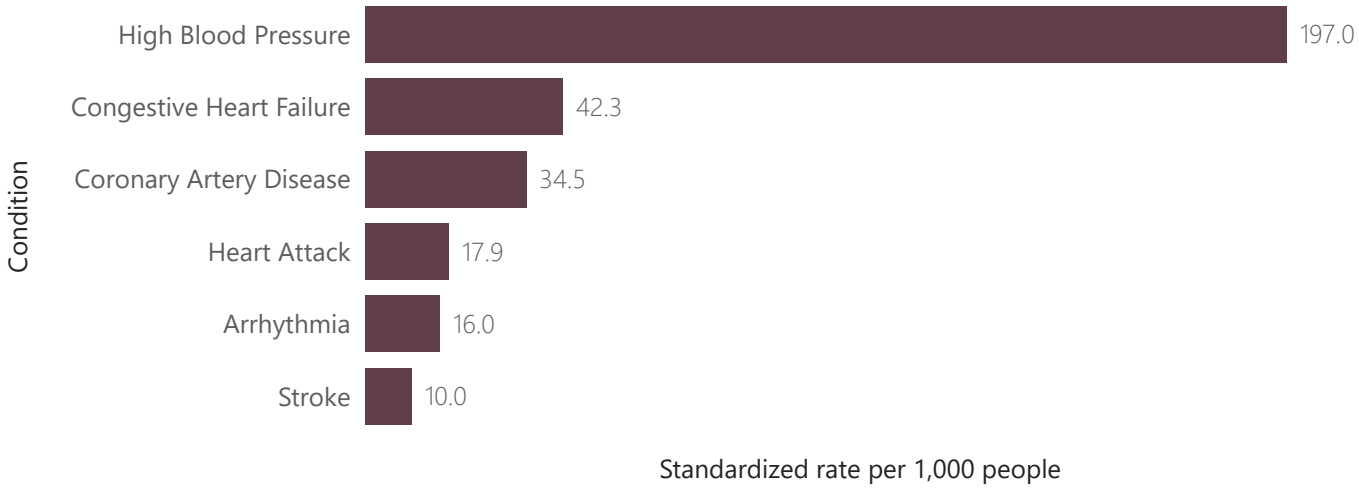


Cardiovascular Conditions

The cardiovascular system is made up of the heart and a large network of blood vessels. The heart uses these vessels to circulate blood, which contains oxygen and important nutrients, throughout the body and to remove waste products. For this reason, conditions affecting the cardiovascular system can have serious impacts on health and wellbeing.

High blood pressure was most prevalent cardiovascular condition for Mamow Ahyamowen

Graph 12. Cardiovascular conditions by prevalence, Mamow Ahyamowen, 2019



Of all the cardiovascular conditions we looked at, high blood pressure was the most prevalent for Mamow Ahyamowen, at 197.0 cases per 1,000 people. In fact, the rate of high blood pressure was around 4.6 times higher than congestive heart failure, which was the second most prevalent condition at 42.3 per 1,000 people.

> My dad passed away at a hockey tournament in the region a few years ago. They recently renamed the tournament after him, so now we have the Raymond Butterfly Memorial Cup. For me it's healing because we've been able to use that opportunity to provide education on cardiovascular diseases. Last year, we offered screening opportunities. There were tables where we provided education about all things heart health. We had some CPR races for the kids. We also had a healthy eating table and people from the health authority taking blood and doing some ECG screenings. It's something we're going to keep doing moving forward. For me, that's a big positive and definitely something that helps me heal. That we're making the community healthier and learning from tragedies as a community.

—Khadyn Butterfly
Community Member, Moose Cree First Nation
Senior Analyst, Evaluation, Research and Engagement
Weeneebayko Area Health Authority



What We Heard

Event participants noted that First Nations people are often at high risk for cardiovascular conditions due to intergenerational trauma and the emotional distress associated with community crises such as premature mortality and death by suicide. Many community members turn to smoking or alcohol use to cope, which increases this risk even further.

In the remote communities served by Mamow Ahyamowen, where the only option for in-person care is Nursing Stations, these risks are amplified. While the staff at Nursing Stations can manage some cardiovascular symptoms, they don't have the equipment or capacity to deal with more severe cases or conditions. Community members have to be transported by plane or helicopter to a hospital so they can receive the care they need. Transportation can be delayed due to paramedic shortages, weather, and administrative barriers associated with the Non-Insured Health Benefits (NIHB) program. Beyond initial diagnosis and care, these challenges can also lead to missed follow-up visits. Furthermore, difficulties in accessing and sharing medical records can make it hard for patients to navigate the health care system. Because of these barriers, many community members aren't diagnosed with or treated for cardiovascular conditions until much later than they should be.

Our findings likely underestimate the prevalence of cardiovascular conditions for Mamow Ahyamowen communities because we were not able to access data from Nursing Stations. This means that findings for Mamow Ahyamowen, particularly in remote communities, are more likely to be missing mild or moderate cases of cardiovascular conditions that could be treated at a Nursing Station.

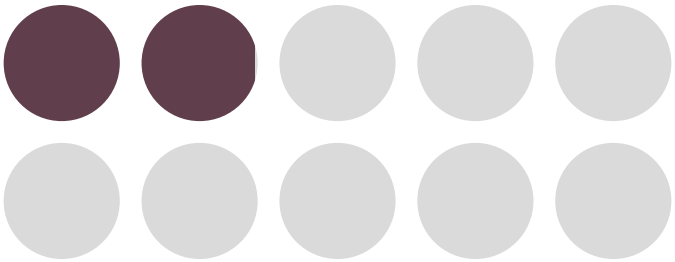
Even for those living in larger urban centers with better access to services, some community members don't always seek care for serious cardiovascular symptoms right away because of racism in the health care system. Furthermore, primary care shortages mean that many community members don't get the preventative care, monitoring, referrals to specialists, or follow-up they need. For these reasons, the people we spoke to voiced a strong need for a First Nations heart health strategy.

High Blood Pressure

The technical term for high blood pressure is hypertension. This happens when the force of blood pushing against artery walls is consistently high, which means the heart has to work harder (12). If left untreated, high blood pressure can make people more likely to develop other cardiovascular conditions (13). A lot of people with high blood pressure don't show symptoms for a long time, so regular screening is very important.

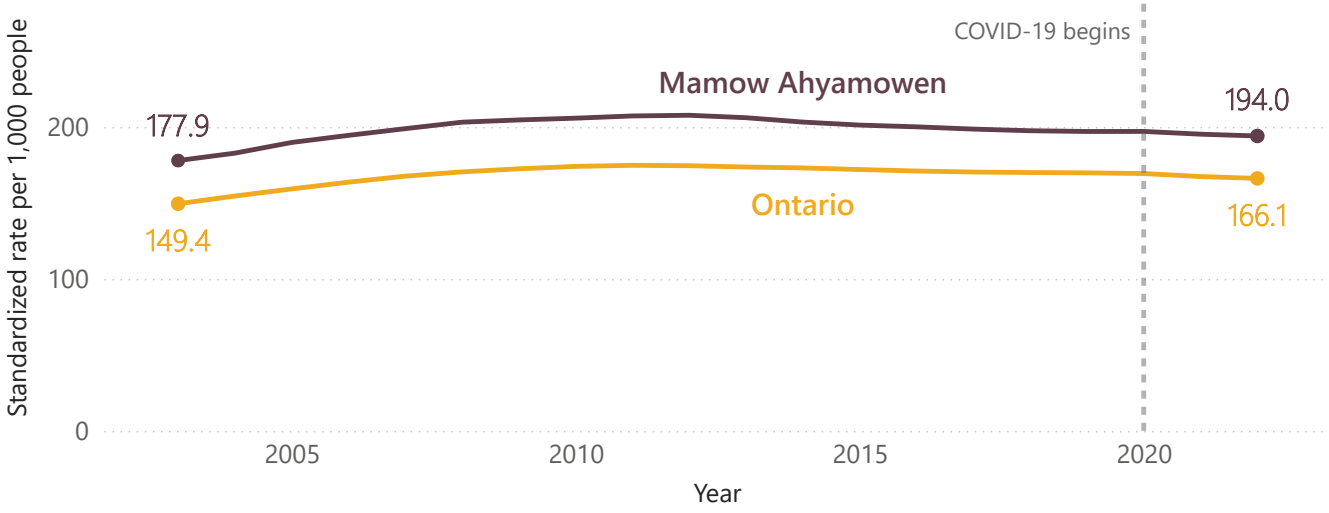
In 2019, the prevalence of high blood pressure for Mamow Ahyamowen was 197.0 cases per 1,000 people.

On average, this means that **almost 2 out of every 10** community members had experienced high blood pressure at some point in their life.



Prevalence of high blood pressure increased slightly for Mamow Ahyamowen

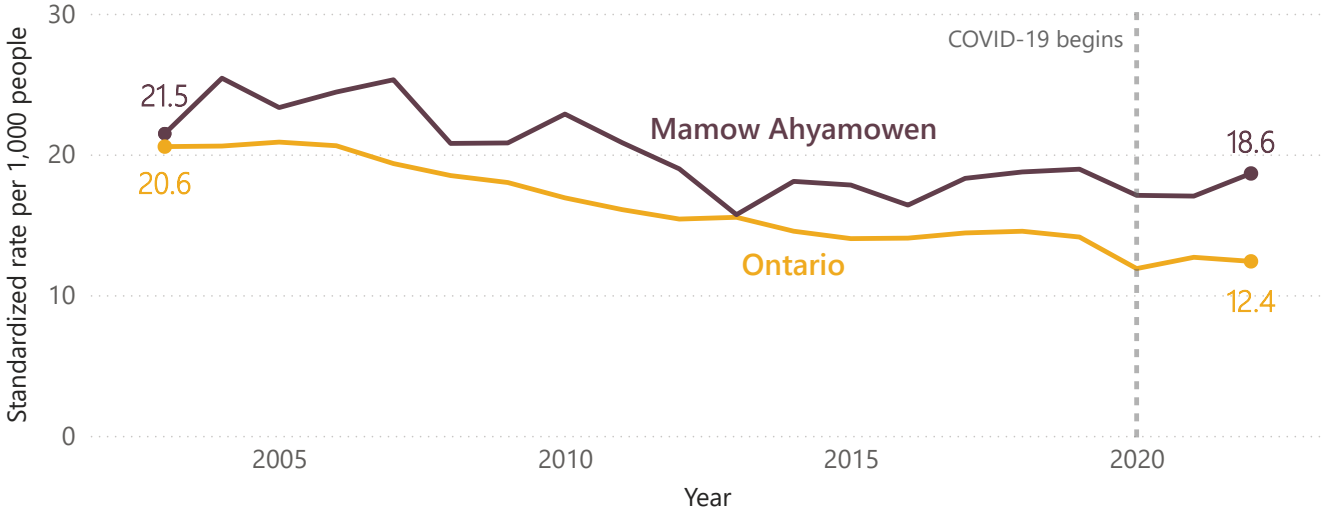
Graph 13. Prevalence of high blood pressure over time, 2003-2022



The prevalence of high blood pressure for Mamow Ahyamowen increased slightly from 177.9 cases per 1,000 people in 2003 to 194.0 per 1,000 people in 2022. The prevalence for Ontario overall was slightly lower and followed a similar pattern over time, increasing slightly from 149.4 cases per 1,000 people in 2003 to 166.1 per 1,000 in 2022.

Incidence of high blood pressure decreased slightly for Mamow Ahyamowen

Graph 14. Incidence of high blood pressure over time, 2003-2022



The incidence of high blood pressure for Mamow Ahyamowen decreased slightly from 21.5 new cases per 1,000 people in 2003 to 18.6 per 1,000 people in 2022. There was some fluctuation in these rates over time. This is probably because the Mamow Ahyamowen population is relatively small, meaning that small changes in the number of people being diagnosed with this condition have a bigger impact. The incidence for Ontario overall was initially similar, at 20.6 new cases per 1,000 people in 2003, but decreased more quickly to 12.4 per 1,000.

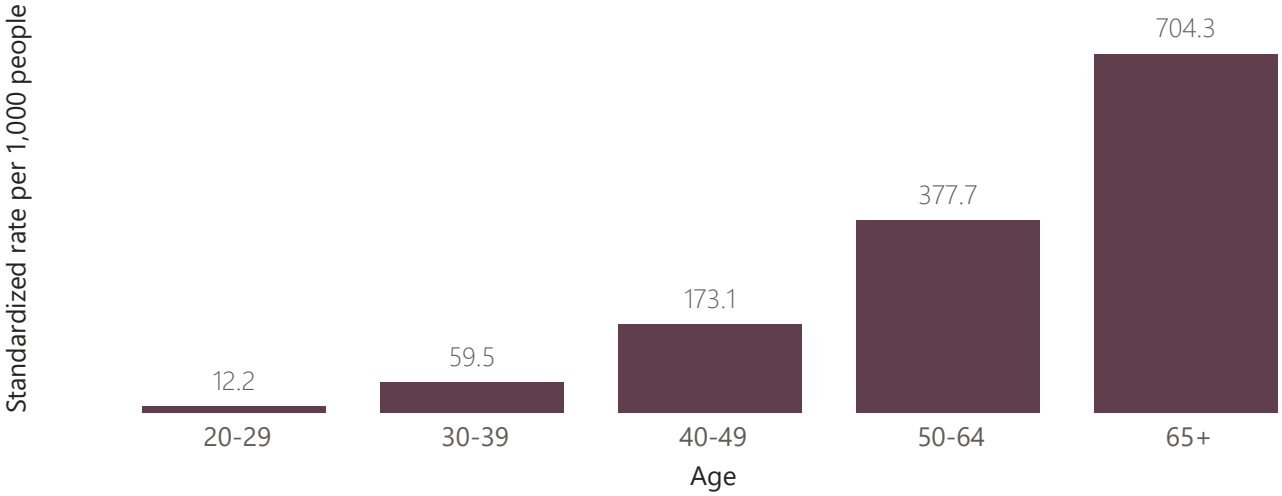
So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with high blood pressure each year. Together with the increase in prevalence, this could mean that community members with high blood pressure are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising even though there's less water flowing from the faucet. This could mean that less water is draining out of the tub.

Prevalence of high blood pressure was highest for community members aged 65+

Graph 15. Prevalence of high blood pressure by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of high blood pressure in 2019 was highest for community members aged 65 and older, at 704.3 per 1,000 people. On average, this means that around 7 out of every 10 community members in this age group had experienced high blood pressure as of 2019.

When broken down by sex, the prevalence of high blood pressure in 2019 was **similar for male and female community members**.



196.4 cases per 1,000

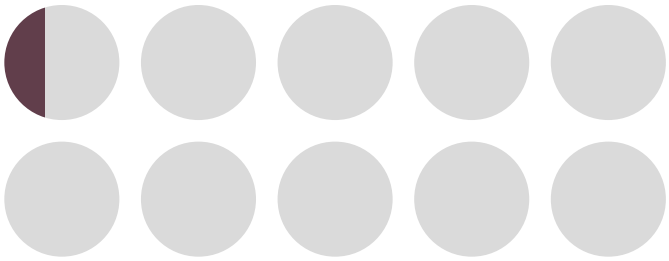
197.1 cases per 1,000

Coronary Artery Disease

Coronary arteries are special types of blood vessels that supply oxygen-rich blood to the heart muscle. When these arteries become blocked, it is called coronary artery disease (14). This condition can lead to other heart problems, making early diagnosis and treatment important.

In 2019, the prevalence of coronary artery disease for Mamow Ahyamowen was 34.5 cases per 1,000 people.

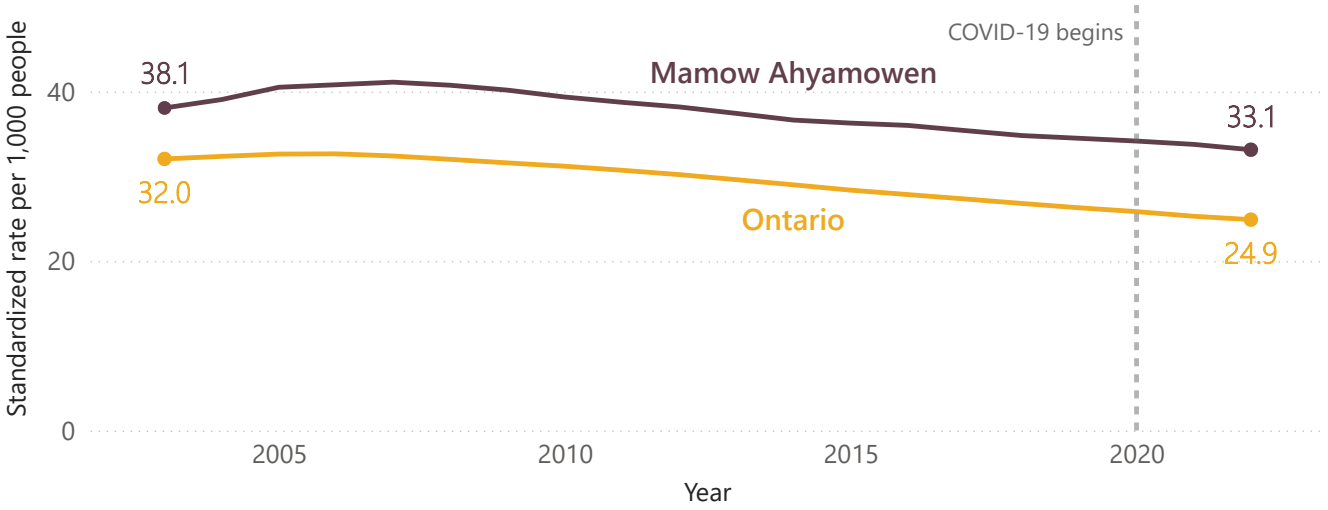
On average, this means that **fewer than 1 out of every 10** community members were living with coronary artery disease.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of coronary artery disease decreased slightly for Mamow Ahyamowen

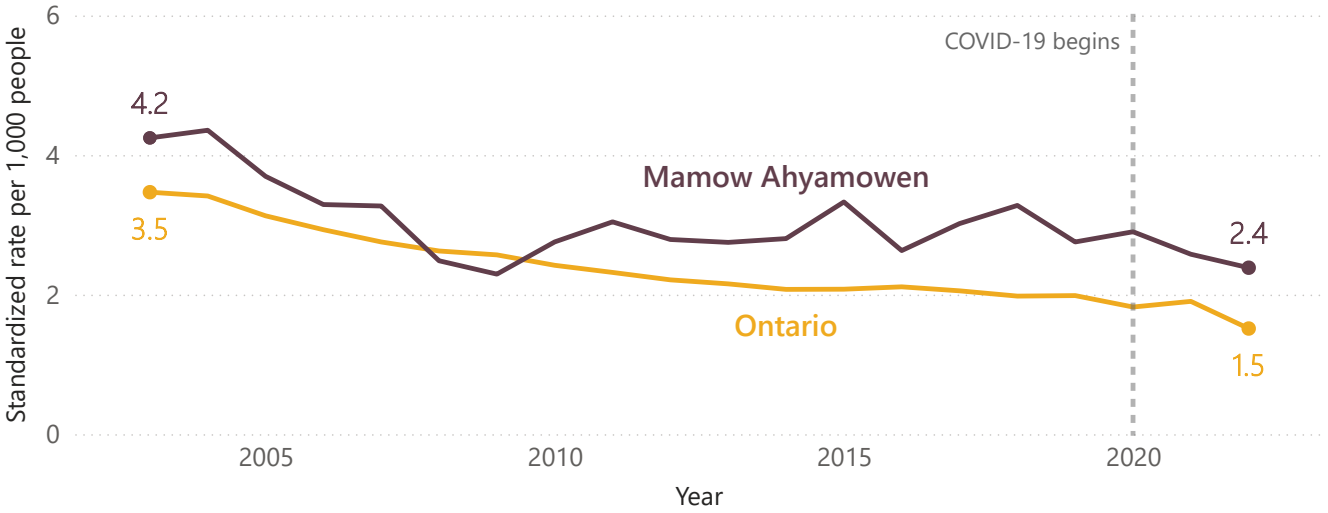
Graph 16. Prevalence of coronary artery disease over time, 2003-2022



The prevalence of coronary artery disease for Mamow Ahyamowen decreased slightly from 38.1 cases per 1,000 people in 2003 to 33.1 per 1,000 in 2022. The prevalence for Ontario overall was lower but followed a similar pattern over time, decreasing a bit more from 32.0 cases per 1,000 people in 2003 to 24.9 per 1,000 in 2022.

Incidence of coronary artery disease decreased for Mamow Ahyamowen

Graph 17. Incidence of coronary artery disease over time, 2003-2022



The incidence of coronary artery disease for Mamow Ahyamowen decreased from 4.2 new cases per 1,000 people to 2.4 per 1,000. There was some fluctuation in these rates over time. This is probably because the Mamow Ahyamowen population is relatively small, meaning that small changes in the number of people being diagnosed with this condition have a bigger impact. The incidence for Ontario overall was lower and decreased more dramatically from 3.5 new cases per 1,000 people in 2003 to 1.5 per 1,000 in 2022.

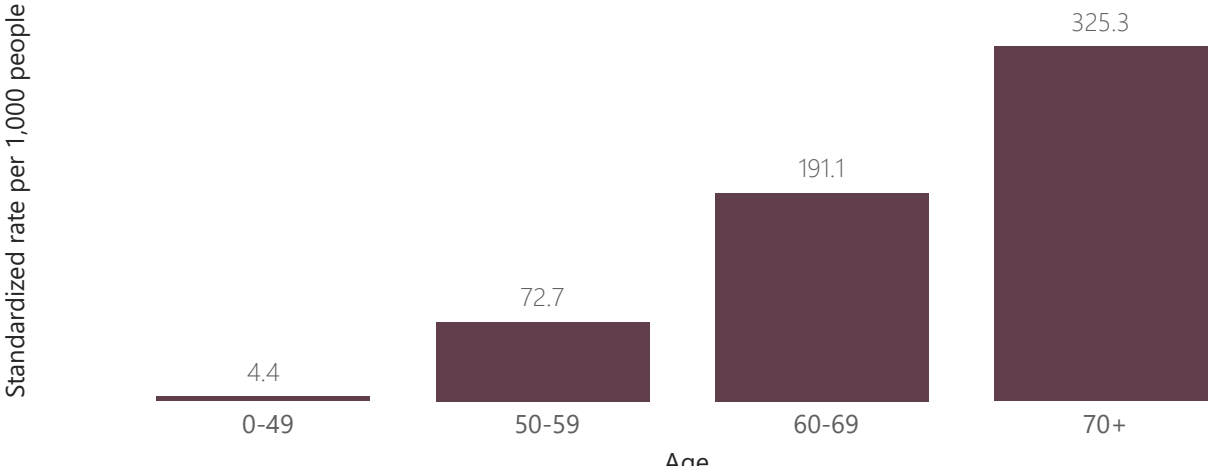
So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with coronary artery disease each year. Based on the decrease in prevalence, it could also be that community members with coronary artery disease aren't living as long or that more of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is slowly going down. We know that this is partly because less water is flowing from the faucet. It could also be that there is more water draining out of the tub.

Prevalence of coronary artery disease was highest for community members aged 70+

Graph 18. Prevalence of coronary artery disease by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of coronary artery disease in 2019 was highest for community members aged 70 and older, at 325.3 per 1,000 people in 2019.

When broken down by sex, the prevalence of coronary artery disease in 2019 was **higher for male community members** compared to females.



28.1 cases per 1,000

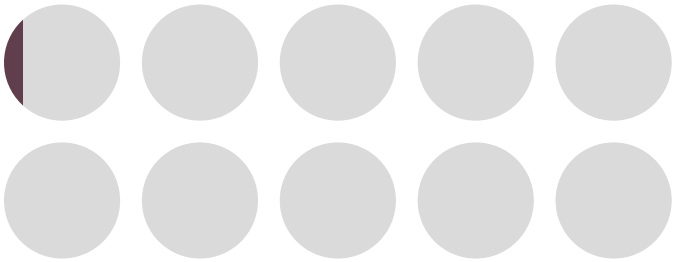
41.1 cases per 1,000

Arrhythmia

Arrhythmia is when the heart beats too fast, too slow, or isn't following a regular rhythm (15). Sometimes, people can feel this happening, but other times they might not. While arrhythmia can be harmless, it does have the potential to be serious because it affects the heart's ability to pump blood throughout the body.

In 2019, the prevalence of arrhythmia for Mamow Ahyamowen was 16.0 cases per 1,000 people.

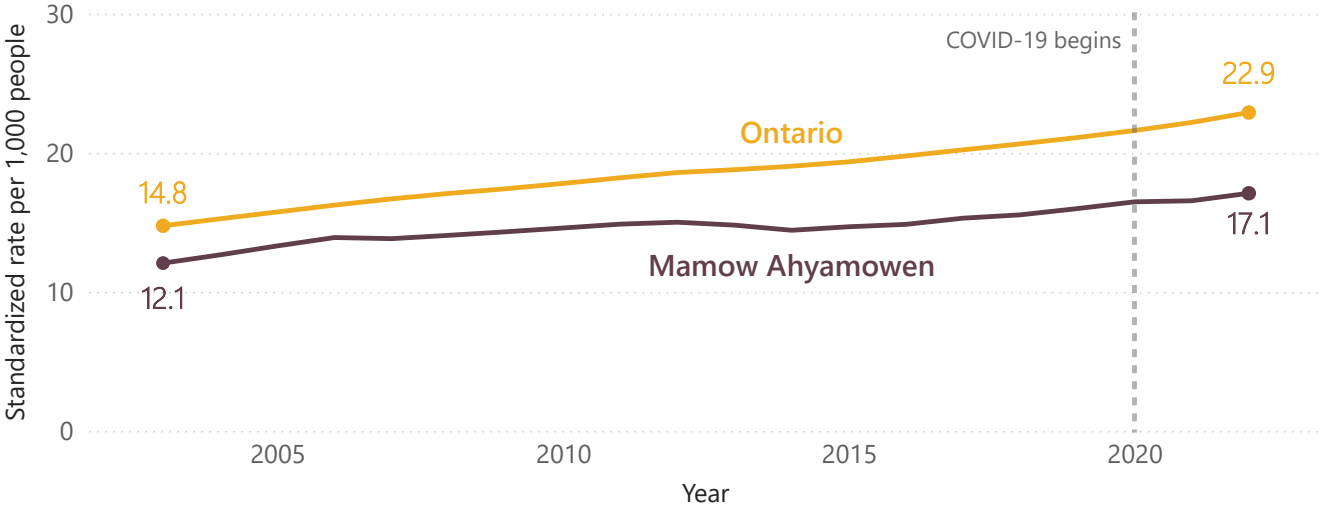
On average, this means that **fewer than 1 out of every 10** community members had experienced arrhythmia at some point in their lives.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of arrhythmia increased for Mamow Ahyamowen

Graph 19. Prevalence of arrhythmia over time, 2003-2022



The prevalence of arrhythmia for Mamow Ahyamowen increased from 12.1 cases per 1,000 people in 2003 to 17.1 per 1,000 in 2022. The prevalence for Ontario overall was higher and followed a similar pattern, increasing from 14.8 cases per 1,000 people in 2003 to 22.9 per 1,000 in 2022.

The incidence of arrhythmia for Mamow Ahyamowen didn't change a lot over time, at 1.4 new cases per 1,000 people in 2003 and 1.3 per 1,000 in 2022 (figure not shown). The incidence for Ontario overall was slightly higher and followed a different pattern over time, decreasing slightly from 1.8 new cases per 1,000 people in 2003 to 1.5 per 1,000 in 2022.

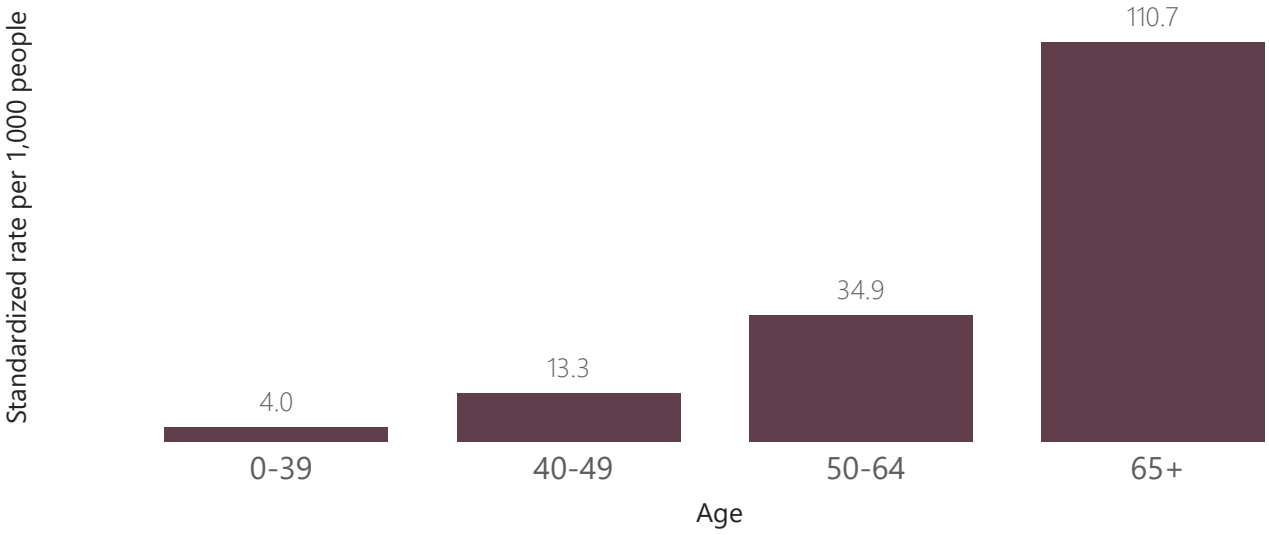
So What?

The incidence for Mamow Ahyamowen hasn't changed a lot over time, which suggests that around the same proportion of community members are being diagnosed with arrhythmia each year. Together with the increase in prevalence, this could mean that community members with arrhythmia are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising even though the amount of water flowing from the faucet hasn't changed very much. This could mean that less water is draining out of the tub.

Prevalence of arrhythmia was highest for community members aged 65+

Graph 20. Prevalence of arrhythmia by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of arrhythmia in 2019 was highest for community members aged 65 and older, at 110.7 per 1,000 people.

When broken down by sex, the prevalence of arrhythmia in 2019 was **slightly higher for male community members** compared to females.



14.8 cases per 1,000

17.2 cases per 1,000

What We Heard

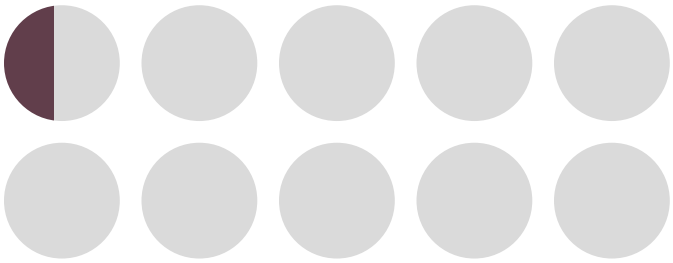
Event participants felt that these numbers may underestimate the true prevalence and incidence of arrhythmia. Many people who have this condition aren't diagnosed with it because they don't seek care for symptoms that they think are mild. For those who do, it is possible that cases are missed because primary health care providers don't always have the skills to read Echocardiograms (ECGs), a test that is used to check the function of the heart. Although conditions such as arrhythmia are short term and episodic, repeated occurrences may cause symptoms to snowball into larger complications that require long term management.

Congestive Heart Failure

Congestive heart failure happens when the heart isn't working as well as it should (16). When the heart pumps less blood, it causes fluid to build up throughout the body. This puts even more stress on the heart.

In 2019, the prevalence of congestive heart failure for Mamow Ahyamowen was 42.3 cases per 1,000 people.

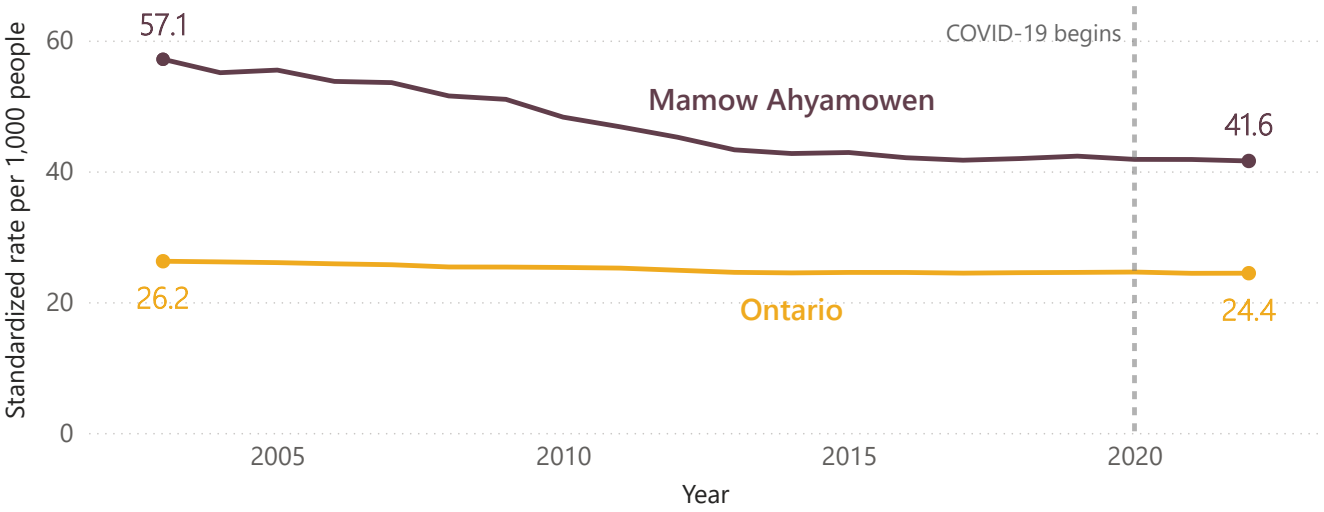
On average, this means that **fewer than 1 out of every 10** community members was living with congestive heart failure.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of congestive heart failure decreased for Mamow Ahyamowen

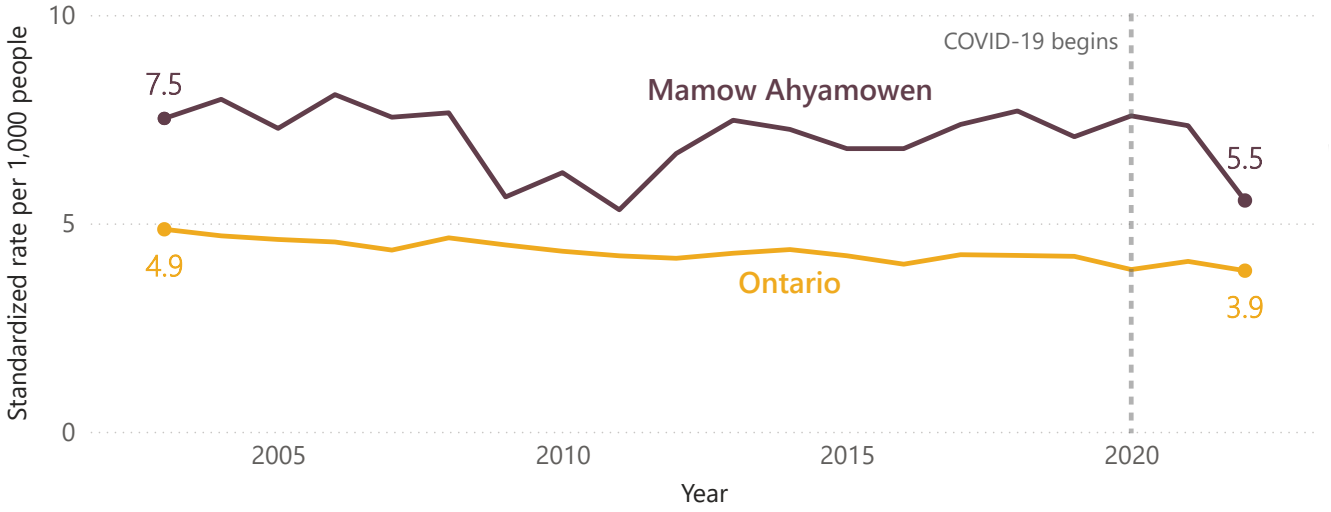
Graph 21. Prevalence of congestive heart failure over time, 2003-2022



The prevalence of congestive heart failure for Mamow Ahyamowen decreased from 57.1 cases per 1,000 people in 2003 to 41.6 per 1,000 in 2022. The prevalence for Ontario overall was lower and followed a different pattern over time, decreasing slightly from 26.2 cases per 1,000 people in 2003 to 24.4 per 1,000 in 2022.

Incidence of congestive heart failure decreased for Mamow Ahyamowen

Graph 22. Incidence of congestive heart failure over time, 2003-2022



The incidence of congestive heart failure for Mamow Ahyamowen decreased from 7.5 new cases per 1,000 people in 2003 to 5.5 per 1,000 in 2022. There was some fluctuation in these rates over time. This is probably because the Mamow Ahyamowen population is relatively small, meaning that small changes in the number of people being diagnosed with this condition have a bigger impact. The incidence for Ontario overall was lower but followed a similar pattern over time, decreasing from 4.9 new cases per 1,000 people in 2003 to 3.9 per 1,000 in 2022.

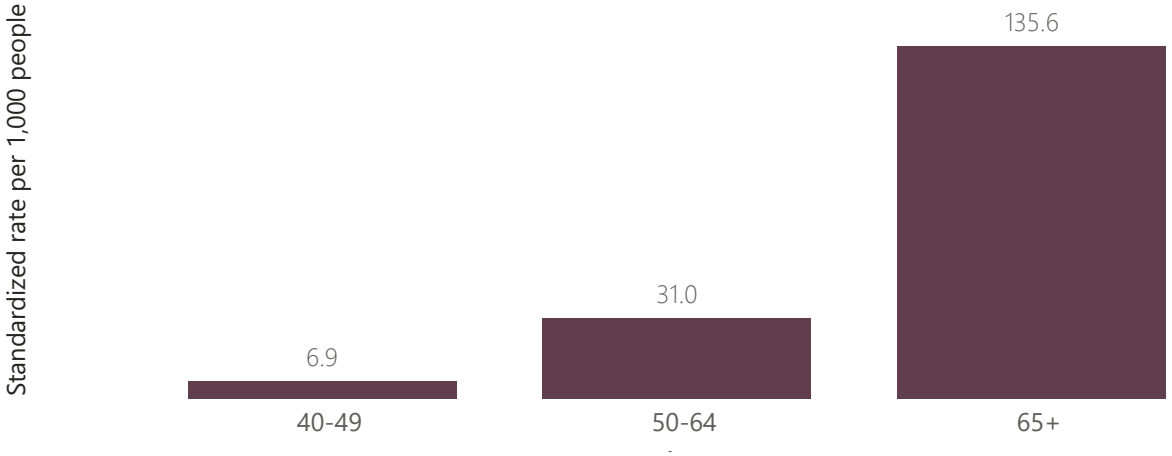
So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with congestive heart failure each year. Based on the decrease in prevalence, it could also be that community members with congestive heart failure aren't living as long or that more of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is slowly going down. We know that this is partly because less water is flowing from the faucet. It could also be that there is more water draining out of the tub.

Prevalence of congestive heart failure was highest for community members aged 65+

Graph 23. Prevalence of congestive heart failure by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of congestive heart failure in 2019 was highest for community members aged 65 and over, at 135.6 per 1,000 people.

When broken down by sex, the prevalence of congestive heart failure in 2019 was **slightly higher for male community members** compared to females.



38.9 cases per 1,000

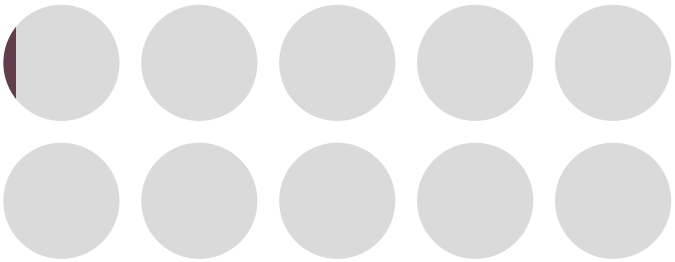
45.8 cases per 1,000

Stroke

A stroke happens when a blood vessel in the brain is blocked or breaks (17). This prevents the brain from getting the oxygen-rich blood it needs, which can cause brain tissue to die. The impact and severity of a stroke depend on where it happens in the brain and how much tissue is affected. Although a stroke is an acute event rather than a chronic condition, we included it in this project because it can have long term impacts on people's health and wellbeing. People who have experienced a stroke need to be followed by a health care provider, as they can develop complications over time. Some may even need support completing or relearning basic tasks such as talking, walking, and swallowing.

In 2019, the prevalence of stroke for Mamow Ahyamowen was 10.0 cases per 1,000 people.

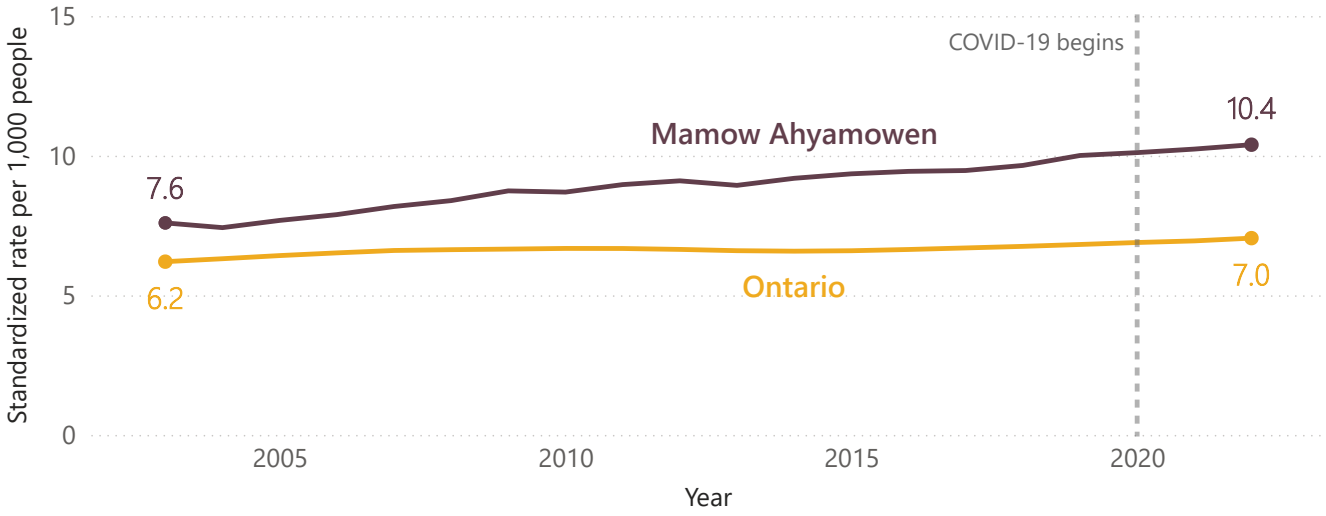
On average, this means that **fewer than 1 out of every 10** community members had experienced a stroke at some point in their life.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of stroke increased for Mamow Ahyamowen

Graph 24. Prevalence of stroke over time, 2003-2022



The prevalence of stroke for Mamow Ahyamowen increased from 7.6 cases per 1,000 people in 2003 to 10.4 per 1,000 in 2022. The prevalence for Ontario overall was lower and increased more gradually from 6.2 cases per 1,000 people in 2003 to 7.0 per 1,000 in 2022.

The incidence of stroke for Mamow Ahyamowen increased from 0.7 new cases per 1,000 people in 2003 to 1.1 per 1,000 in 2022 (figure not shown). The incidence for Ontario overall started out higher, at 1.0 new cases per 1,000 people in 2003, and followed at very different pattern, decreasing to 0.8 per 1,000 people in 2022.

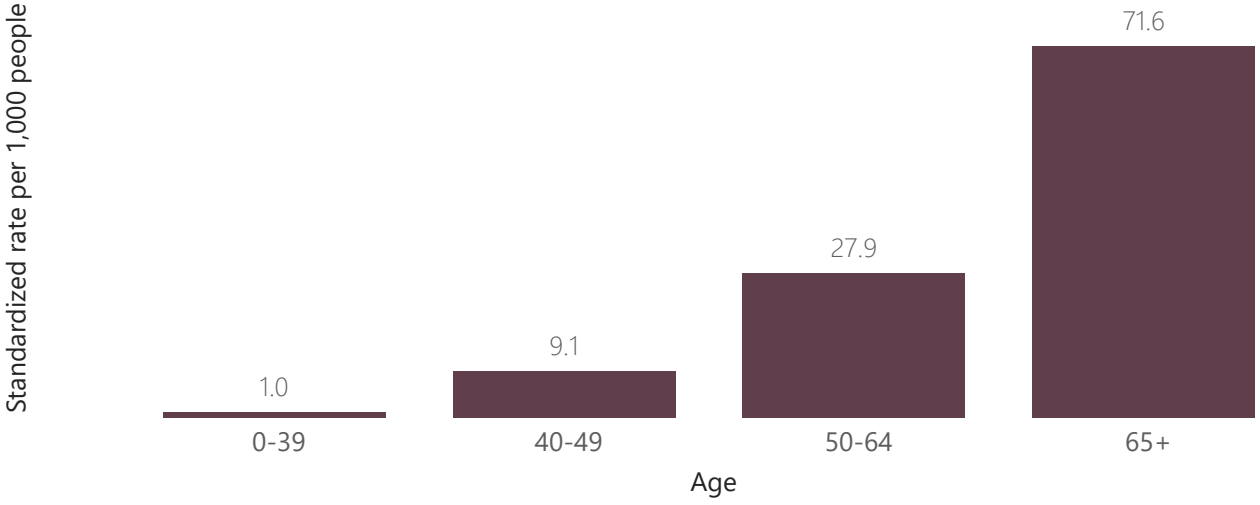
So What?

The increase in incidence that we observed for Mamow Ahyamowen suggests that more community members are experiencing strokes each year. Based on the increase in prevalence, it could also be that community members who experience strokes are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising. We know that this is partly because more water is flowing from the faucet. It could also be that less water is draining out of the tub.

Prevalence of stroke was highest for community members aged 65+

Graph 25. Prevalence of stroke by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of stroke in 2019 was highest for community members aged 65 and over at 71.6 per 1,000 people.

When broken down by sex, the prevalence of stroke in 2019 was **slightly higher for male community members** compared to females.



9.7 cases per 1,000



10.5 cases per 1,000

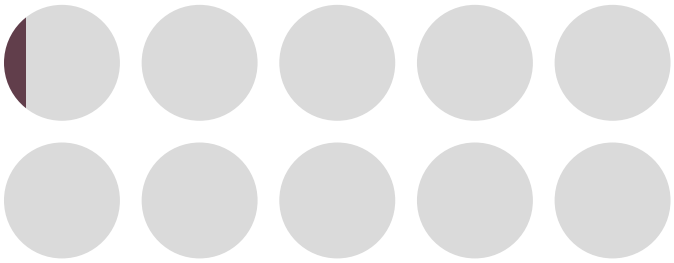


Heart Attack

The technical term for heart attack is acute myocardial infarction (AMI) (18). This happens when blood flow to the heart suddenly stops, which causes part of the heart muscle to die. Although a heart attack is an acute event rather than a chronic condition, we included it in this project because it can have long term impacts on people's health. People who have experienced a heart attack often need multiple follow-ups and can develop complications over time.

In 2019, the prevalence of heart attacks for Mamow Ahyamowen was 17.9 cases per 1,000 people.

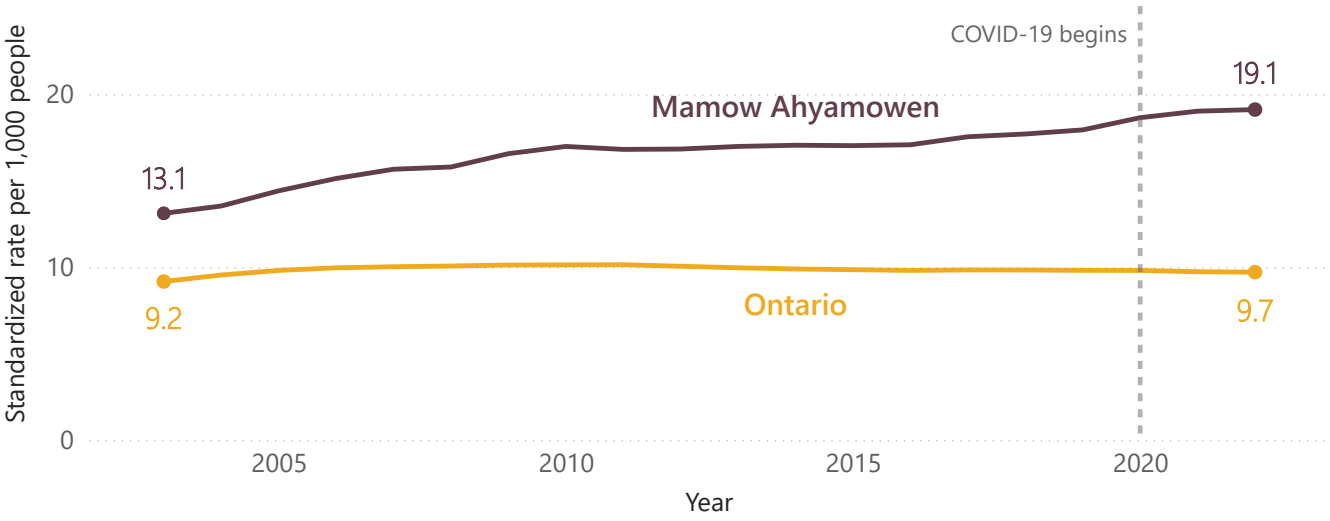
On average, this means that **fewer than 1 out of every 10** community members had experienced a heart attack at some point in their life.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of heart attack increased for Mamow Ahyamowen

Graph 26. Prevalence of heart attack over time, 2003-2022



The prevalence of heart attack for Mamow Ahyamowen increased from 13.1 cases per 1,000 people in 2003 to 19.1 per 1,000 in 2022. The prevalence for Ontario overall was lower and followed a different

pattern over time, staying relatively consistent at 9.2 cases per 1,000 people in 2003 and 9.7 per 1,000 in 2022.

In 2022, the prevalence of heart attack for Mamow Ahyamowen was double that of Ontario overall.

The incidence of heart attack for Mamow Ahyamowen didn't change a lot over time, at 1.9 new cases per 1,000 people in 2003 and 2022 (figure not shown). The incidence for Ontario overall started out slightly lower at 1.4 new cases per 1,000 people, decreasing to 0.8 per 1,000 in 2022.

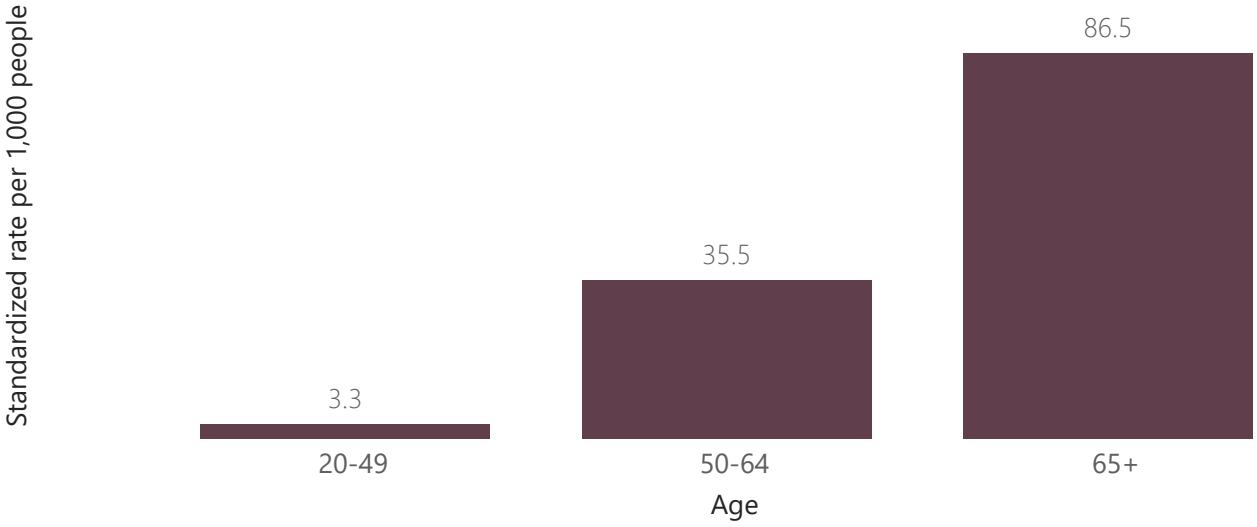
So What?

The incidence for Mamow Ahyamowen hasn't changed a lot over time, which suggests that around the same proportion of community members are experiencing heart attacks each year. Together with the increase in prevalence, this could mean that community members who experience heart attacks are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising even though the amount of water flowing from the faucet hasn't changed very much. This could mean that less water is draining out of the tub.

Prevalence of heart attack was highest for community members aged 65+

Graph 27. Prevalence of heart attack by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of heart attack in 2019 was highest for community members aged 65 and older, at 86.5 per 1,000 people.

When broken down by sex, the prevalence of heart attack in 2019 was **almost twice as high for male community members** compared to females.



12.2 cases per 1,000

23.9 cases per 1,000



Respiratory Conditions

The respiratory system includes organs and structures that are involved in breathing. Its main function is to bring in oxygen and to get rid of carbon dioxide, which your body doesn't need.

What We Heard

When it comes to respiratory conditions, event participants noted a few factors that play a big role in Mamow Ahyamowen communities, especially those that are remote. For example, it is more common in remote communities for people to heat their homes using wood stoves due to a lack of natural gas service and the high cost of electricity and fuel. Overcrowding and poor building quality can create conditions that allow for mold growth (19). Additionally, wildfires—which are becoming more frequent and more severe due to climate change—are more common in many of the rural and remote regions of northern Ontario. Wildfire smoke can worsen respiratory conditions for people who already have them and can put others at higher risk of developing them, as touched on in the quote below.

> Right now, [during the summer of 2025], we have a number of communities that have been evacuated or that are under threat of evacuation because of wildfires. Young children, Elders, people who are expecting a baby, and those with chronic lung disease are usually the first to be evacuated because they're particularly vulnerable. These wildfires have a dramatic impact on lung health, especially for people with chronic conditions.

—Candi Edwards
Director, Approaches to Community Wellbeing
Sioux Lookout First Nations Health Authority
Community Member, Animbiigoo Zaagi'igan Anishinaabek



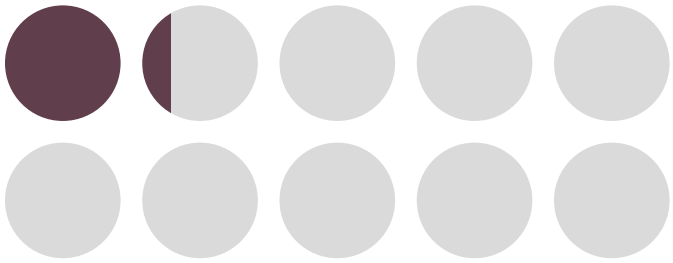
Asthma

Asthma is a condition that causes attacks during which it is hard to breathe (20). Things that often trigger asthma attacks include exercise, allergies, poor air quality, and getting sick. These attacks can range from mild to life-threatening.

> My sister has asthma and she was posting every few days, asking if anyone had a blue puffer. She struggles with alcohol and drug use, she has no transportation. She lives on the reserve. So she was begging people to pick up her puffer…she really struggled. The clinic wasn't very supportive because the health director is our cousin and they're not getting along, you know? Just, so many factors made it hard for her to find help…I guess it's way different living on reserve than it is in an urban center.
>
> —Anonymous Community Member
> Treaty #3 Area

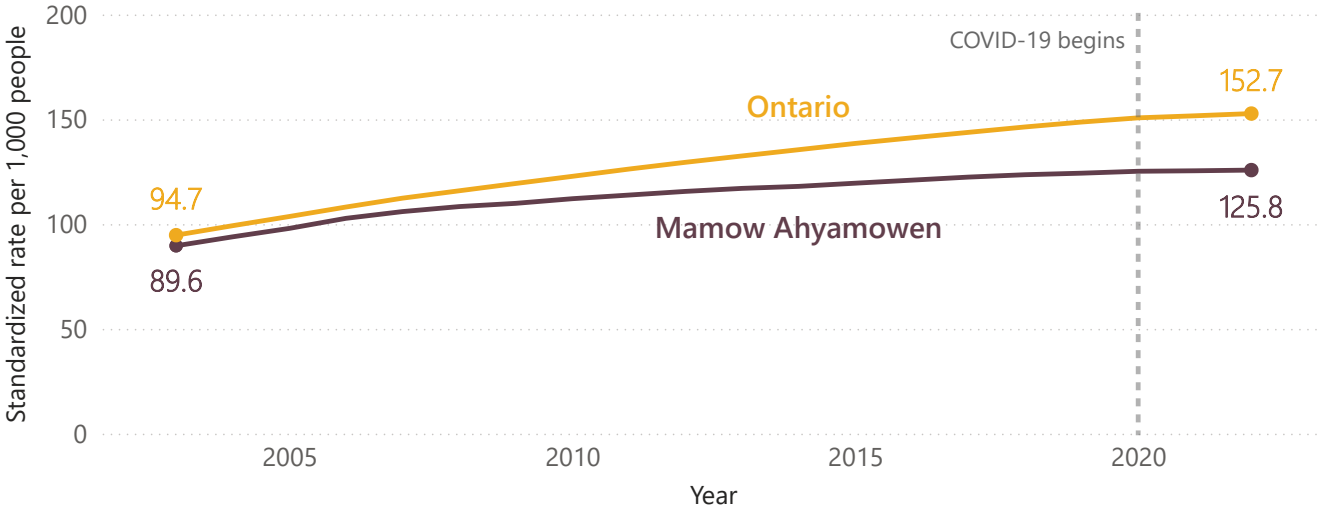
In 2019, the prevalence of asthma for Mamow Ahyamowen was 124.3 cases per 1,000 people.

On average, this means that **just over 1 out of every 10** community members was living with asthma.



Prevalence of asthma increased for Mamow Ahyamowen

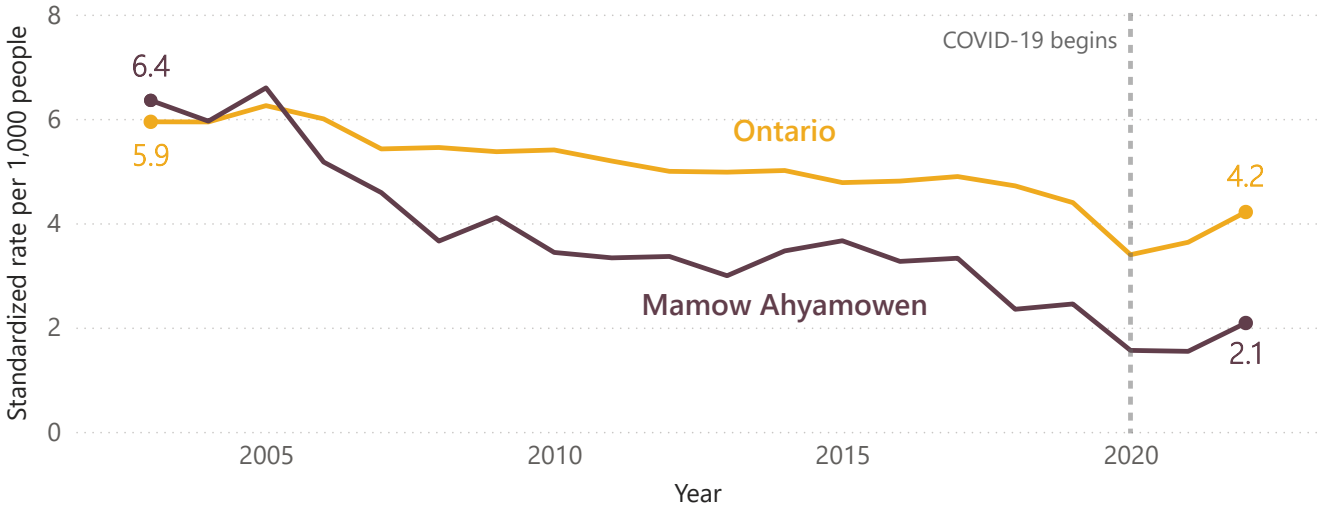
Graph 28. Prevalence of asthma over time, 2003-2022



The prevalence of asthma for Mamow Ahyamowen increased from 89.6 cases per 1,000 people in 2003 to 125.8 per 1,000 people in 2022. The prevalence for Ontario started out relatively similar at 94.7 cases per 1,000 people in 2003, increasing more quickly to 152.7 per 1,000 in 2022.

Incidence of asthma decreased dramatically for Mamow Ahyamowen

Graph 29. Incidence of asthma over time, 2003-2022



The incidence of asthma for Mamow Ahyamowen decreased dramatically from 6.4 new cases per 1,000 people in 2003 to 2.1 per 1,000 in 2022. The incidence for Ontario overall started out slightly lower at 5.9 new cases per 1,000 people and followed a different pattern over time, decreasing more gradually to 4.2 per 1,000 in 2022.

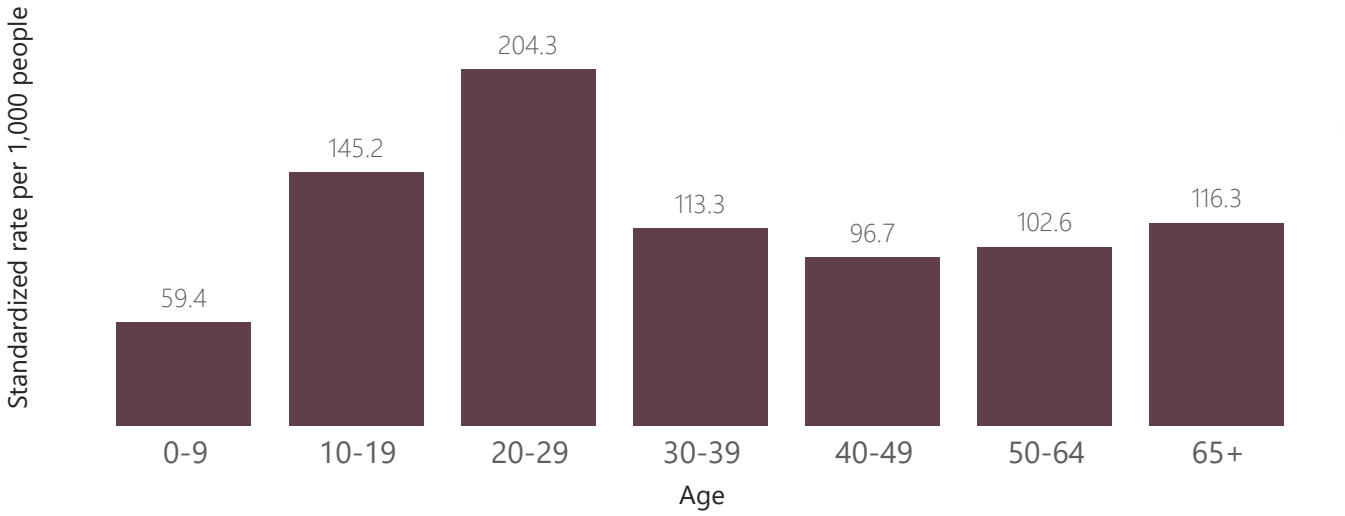
So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with asthma each year. Together with the increase in prevalence, this could mean that community members with asthma are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising even though there's less water flowing from the faucet. This could mean that less water is draining out of the tub.

Prevalence of asthma was highest for community members aged 20-29

Graph 30. Prevalence of asthma by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of asthma in 2019 was highest for community members aged 20 to 29, at 204.3 per 1,000 people.

When broken down by sex, the prevalence of asthma in 2019 was **similar for male and female community members**.



125.6 cases per 1,000



122.7 cases per 1,000

What We Heard

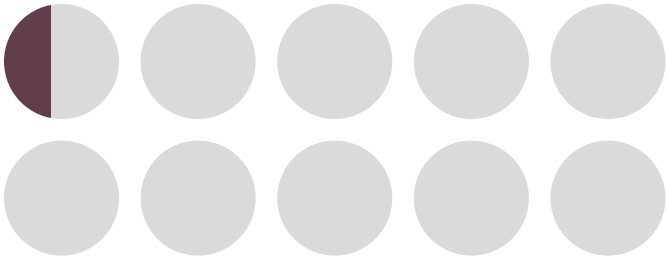
According to event participants, the prevalence of asthma among Mamow Ahyamowen community members is likely higher than what is shown here. Asthma is frequently underdiagnosed, particularly in communities where there is less access to health care. Furthermore, even when community members are able to access health care, asthma symptoms are often lumped with other chronic conditions or are not recognized as serious. In some cases, a health care provider may prescribe a patient asthma medication without giving them a formal diagnosis.

COPD

COPD is a general term for several conditions that make it consistently hard to breathe, including chronic obstructive bronchitis and emphysema (21). Common symptoms include coughing and feeling short of breath. The most common cause of COPD is smoking.

In 2019, the prevalence of COPD for Mamow Ahyamowen was 40.1 cases per 1,000 people.

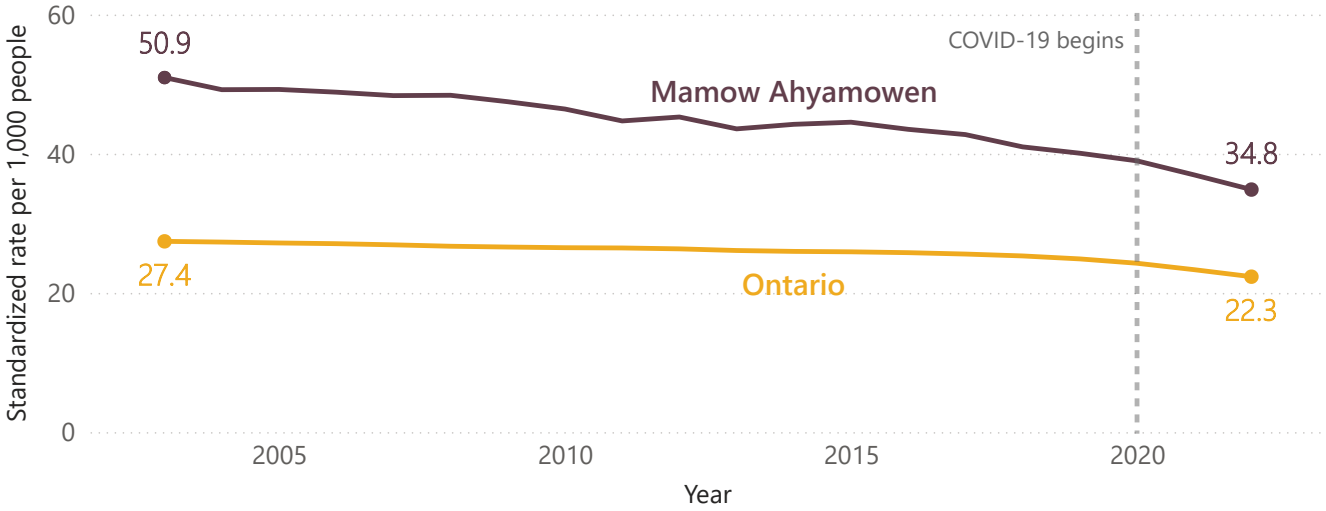
On average, this means that **fewer than 1 out of every 10** community members was living with COPD.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of COPD decreased for Mamow Ahyamowen

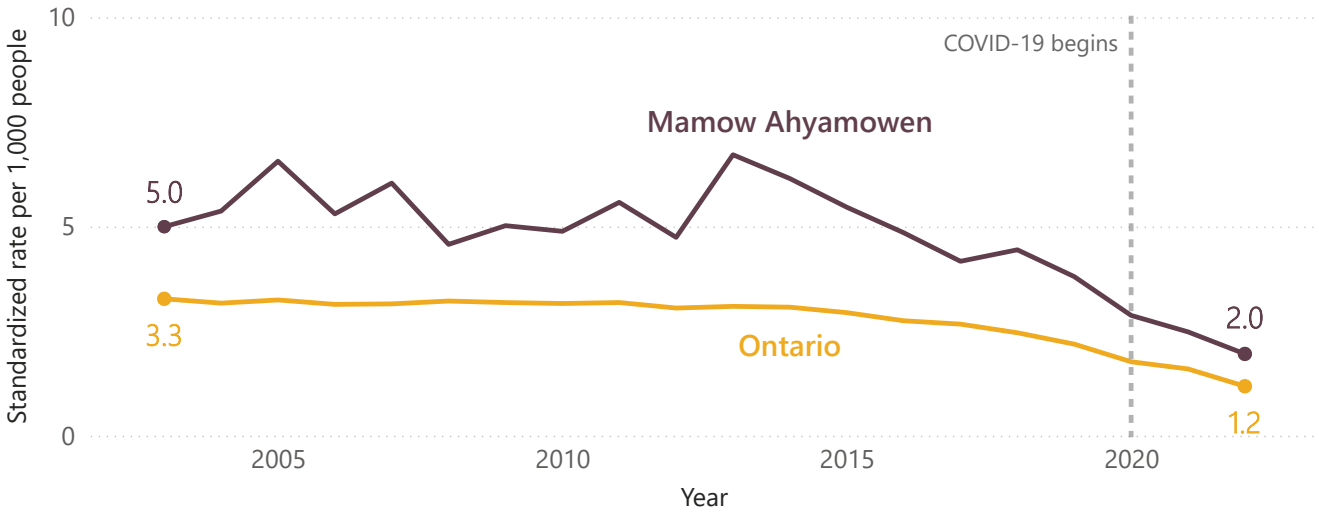
Graph 31. Prevalence of chronic obstructive pulmonary disease over time, 2003-2022



The prevalence of COPD for Mamow Ahyamowen decreased from 50.9 cases per 1,000 people in 2003 to 34.8 per 1,000 in 2022. The prevalence for Ontario overall was lower and decreased more gradually from 27.4 cases per 1,000 people in 2003 to 22.3 per 1,000 in 2022.

Incidence of COPD decreased dramatically for Mamow Ahyamowen

Graph 32. Incidence of chronic obstructive pulmonary disease over time, 2003-2022



The incidence of COPD for Mamow Ahyamowen decreased dramatically from 5.0 new cases per 1,000 people in 2003 to 2.0 per 1,000 people in 2022. There was some fluctuation in these rates over time. This is probably because the Mamow Ahyamowen population is relatively small, meaning that small changes in the number of people being diagnosed with this condition have a bigger impact. The incidence for Ontario overall was lower and more stable but followed a similar overall pattern, decreasing dramatically from 3.3 new cases per 1,000 people in 2003 to 1.2 per 1,000 in 2022.

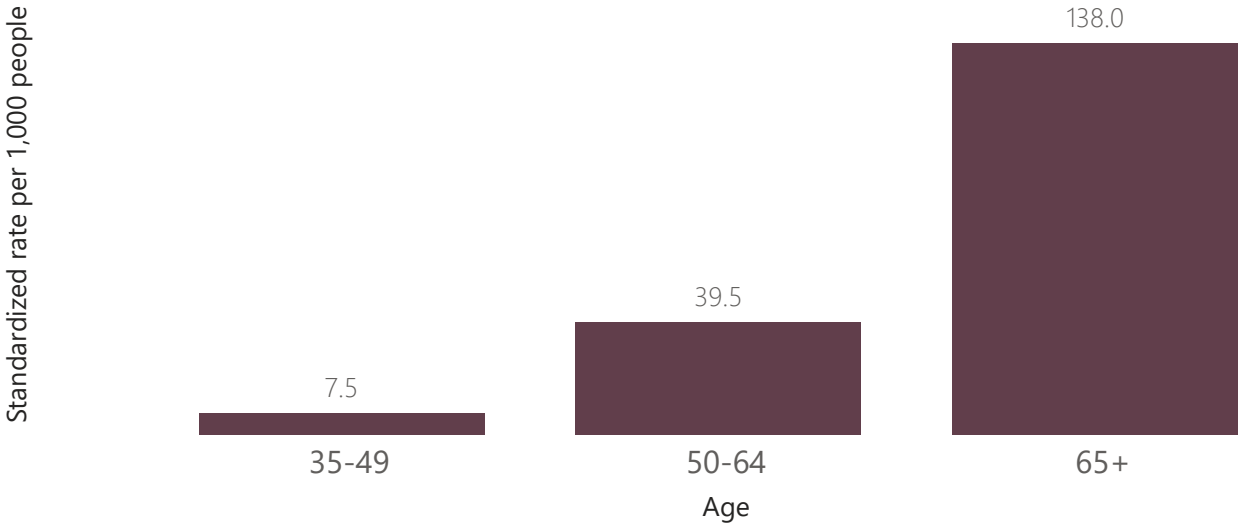
So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with COPD each year. Based on the decrease in prevalence, it could also be that community members with COPD aren't living as long or that more of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is slowly going down. We know that this is partly because less water is flowing from the faucet. It could also be that there is more water draining out of the tub.

Prevalence of COPD was highest for community members aged 65+

Graph 33. Prevalence of chronic obstructive pulmonary disease by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of COPD in 2019 was highest for community members aged 65 and older, at 138.0 per 1,000 people.

When broken down by sex, the prevalence of COPD in 2019 was **similar for male and female community members.**



41.0 cases per 1,000

39.2 cases per 1,000

What We Heard

Event participants felt that the decrease in incidence of COPD for Mamow Ahyamowen in more recent years could have to do with changes in smoking rates. Many Aboriginal Health Access Centres and other health service providers offer Indigenous-specific smoking cessation programs. Some of the people we spoke with felt that these programs have led to a decrease in smoking among community members.



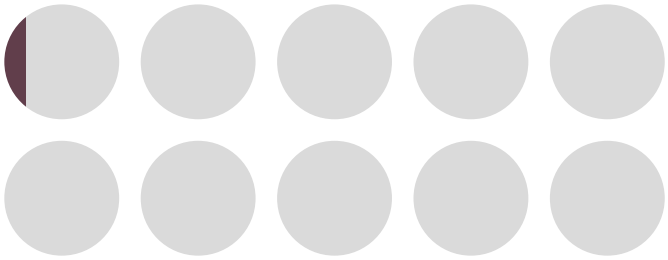


Cancer

Cancer is a condition where abnormal cells grow and multiply (22). As the cells grow, they form tumors that can damage and replace normal tissues. There are many different types of cancer with a wide range of treatments and outcomes.

In 2019, the prevalence of cancer for Mamow Ahyamowen was 18.4 cases per 1,000 people.

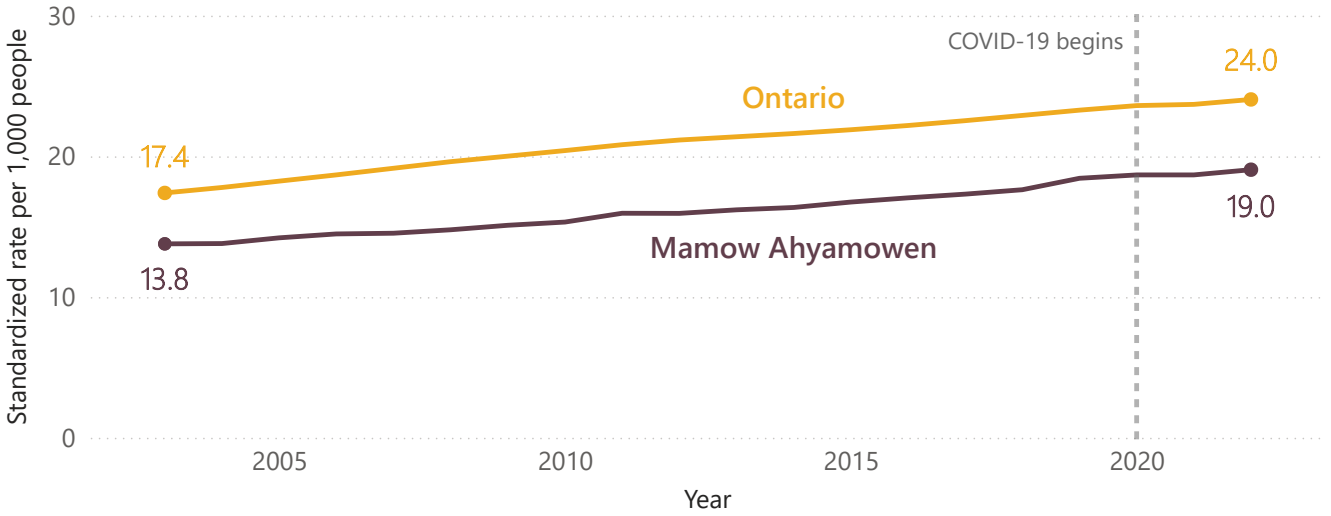
On average, this means that **fewer than 1 out of every 10** community members experienced cancer at some point in their lives.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of cancer increased for Mamow Ahyamowen

Graph 34. Prevalence of cancer over time, 2003-2022



The prevalence of cancer for Mamow Ahyamowen increased from 13.8 cases per 1,000 people in 2003 to 19.0 per 1,000 in 2022. The prevalence for Ontario overall was higher but followed a similar pattern over time, increasing from 17.4 cases per 1,000 people in 2003 to 24.0 per 1,000 in 2022.

The incidence of cancer for Mamow Ahyamowen increased slightly from 2.1 new cases per 1,000 people in 2003 to 2.4 per 1,000 in 2022 (figure not shown). The incidence for Ontario overall was slightly higher and followed a different pattern over time, decreasing slightly from 2.7 new cases per 1,000 people in 2003 to 2.5 per 1,000 people in 2022.

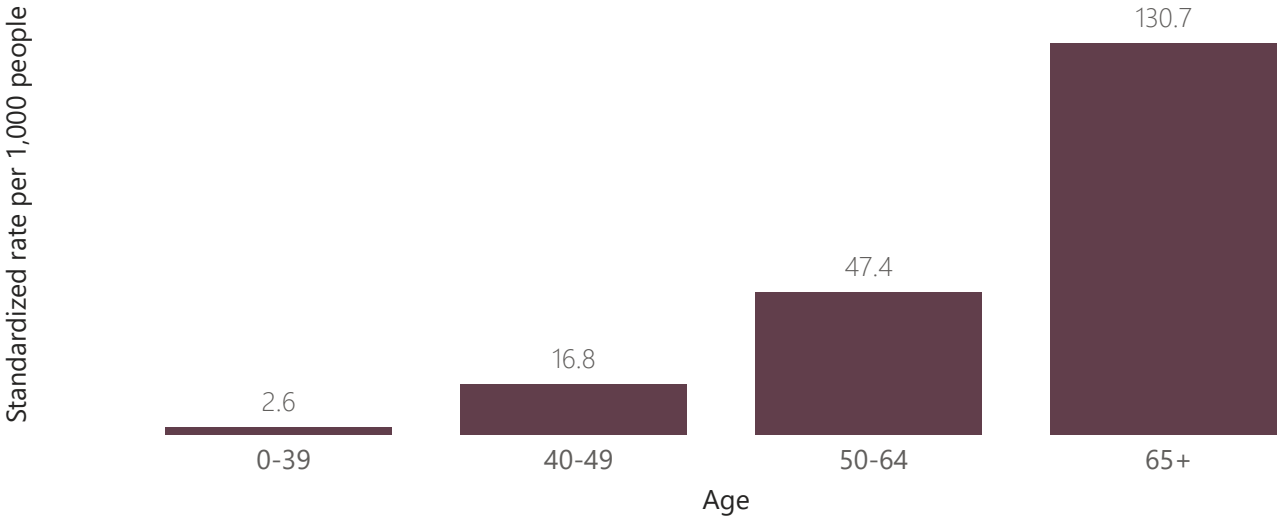
So What?

The increase in incidence that we observed for Mamow Ahyamowen suggests that more community members are being diagnosed with cancer each year. Based on the increase in prevalence, it could also be that community members with cancer are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising. We know that this is partly because more water is flowing from the faucet. It could also be that less water is draining out of the tub.

Prevalence of cancer was highest for community members aged 65+

Graph 35. Prevalence of cancer by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of cancer in 2019 was highest for community members aged 65 and older, at 130.7 per 1,000 people.

When broken down by sex, the prevalence of cancer in 2019 was **higher for female community members** compared to males.



21.2 cases per 1,000

15.7 cases per 1,000

What We Heard

According to event participants, there are many barriers to cancer screening in Mamow Ahyamowen communities, which makes early diagnosis and treatment more difficult. Rural and remote First Nations, especially those without paved roads, have trouble holding mobile screening clinics. When community members can't access screening where they are, their only option is to travel. Even when screening is available, communication is not always clear or culturally-safe. Furthermore, the screening processes for some types of cancers are complicated, which can delay or affect results. Screening rates were already low prior to the COVID-19 pandemic, which only made things worse.

Continuity of care also plays an important role in cancer screening and treatment. Primary care shortages mean that providers often prioritize acute health issues over preventative care. In the north, there is often a reliance on locum physicians who may not be familiar with community members, the care they've received, or the resources available to them. When community members don't have access to primary care at all, they may seek care from emergency departments, where chronic conditions like cancer can be missed. Beyond screening, many people living within community, in rural areas, or in small municipalities have to travel to larger centers to receive cancer treatment, which can affect continuity of care. While the NIHB program offers medical transportation benefits for clients who cannot access services in their community of residence, many clients have highlighted how difficult it can be to get approval or arrange travel through the program. This also means that support services for community members with cancer are not always available, as explained in the quote below.

Our findings likely underestimate the incidence of cancer among members of Mamow Ahyamowen communities. This is especially relevant to those living close to the Ontario-Manitoba border who may be sent to Manitoba for cancer treatment, particularly childhood cancers.

Addressing these challenges requires a holistic, multi-faceted approach that strengthens screening, primary care, awareness and education, continuity of care, and data collection.

When we looked at cancer in the communities we serve, it was identified over and over that people felt like they were navigating things alone or that they didn't have access to programs and services that other people did. For example, there's a program in Thunder Bay around confidence and self-esteem for women navigating cancer. They provide wigs and makeovers and things like that. But it's not available for people outside of Thunder Bay. And so programs and services that would maybe be available in other places – right now communities don't have access to them.

—Candi Edwards
Director, Approaches to Community Wellbeing
Sioux Lookout First Nations Health Authority
Community Member, Animbiigoo Zaagi'igan Anishinaabek



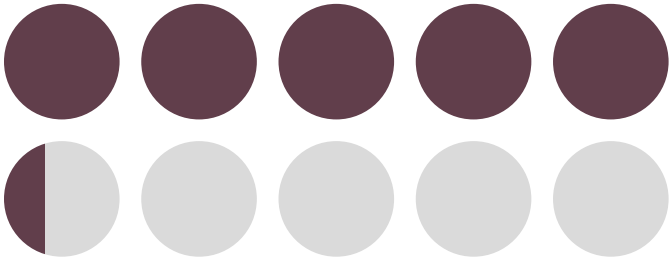


Mental Health and Substance Use Conditions

Mental health relates to someone's ability to cope with stress, realize their full potential, and contribute to their community (23). Everyone has mental health. Some people also experience conditions that affect their mental health, causing serious changes in the way they think, feel, or behave (24). These are also known as mental illnesses.

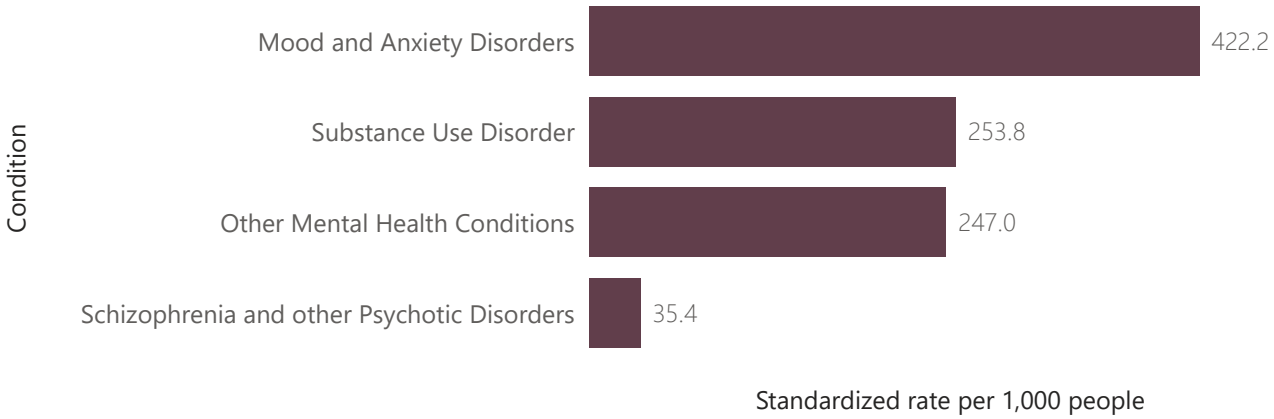
In 2019, the prevalence of mental health and substance use conditions for Mamow Ahyamowen was 535.1 per 1,000 community members.

On average, this means that **just over 5 out of every 10** community members, or half, had experienced a mental health or substance use condition at some point in their lives.



Mood and anxiety disorders were most prevalent mental health condition for Mamow Ahyamowen

Graph 36. Mental health and substance use conditions by prevalence, Mamow Ahyamowen, 2019



Of all the mental health and substance use conditions we looked at, mood and anxiety disorders were the most prevalent for Mamow Ahyamowen community members in 2019, at 422.2 per 1,000 people. Substance use disorder and other mental health conditions—which include those such as eating disorders, sleep disorders, and most types of personality disorders—were also quite prevalent, at 253.8 and 247.0 per 1,000 people, respectively. Schizophrenia and other psychotic disorders were the least prevalent, at 35.4 per 1,000 people.



What We Heard

Event participants emphasized that mental health and substance use are serious issues for many Mamow Ahyamowen communities. During the years we looked at in this project, several communities declared states of emergency related to mental health and substance use, highlighting a dire need for resources and support. Our findings likely underestimate the true number of people living with mental health or substance use conditions, as there are many community members who don't have access to culturally appropriate care in their language of choice, those who choose other forms of care such as traditional healing, or those who choose not to seek care at all. For people who are forced to rely on emergency departments, health care providers might miss mental health and substance use conditions. This is also a concern when it comes to locum physicians, who don't get to know community members in the same way and might miss signs or symptoms of mental illness.

The causes of mental health and substance use conditions are complex. For Mamow Ahyamowen communities, factors like colonization, systemic racism, unresolved grief, and intergenerational trauma are deeply rooted. In some communities, people are reluctant to talk about this, which contributes to the stigma that is already there. When going through the findings, some of the people we spoke with pointed out that the prevalence of certain mental health and substance use conditions increased around 2013 and 2014, which was around the time that the Truth and Reconciliation Commission was engaging First Nations community members and residential school survivors. While we can't say that these events caused the increases, it is reasonable to suggest that they played a role.

Additionally, the people we spoke with felt that social media played an important role because it can cause stress in different areas of people's lives. They also pointed to the impact of the COVID-19 pandemic, which made a lot of existing mental health issues even worse. Finally, many Mamow Ahyamowen communities don't have the resources they need to address these issues, especially compared to regions like southern Ontario.

The prevalence and incidence of mental health and substance use conditions is only one piece of the puzzle. In the future, it will also be important to explore other areas using different types of information:

> We also have to look at resilience. There are many people in community that, despite experiencing a lot of that loss and trauma, are doing okay. What are some of those protective factors and how can we use them to help others? There's an opportunity here to look into that and see what kind of programs and services could be put in place or to support more of what already exists. I don't think we're investing enough in that. There's often a lens of looking at what's wrong with this community or that population. And not enough of a lens of, so much trauma has existed and they're still here, some of them are even thriving. What is it that is supportive and how do we get more of it?
>
> —Candi Edwards
> Director, Approaches to Community Wellbeing
> Sioux Lookout First Nations Health Authority
> Community Member, Animbiigoo Zaagi'igan Anishinaabek



Mood and Anxiety Disorders

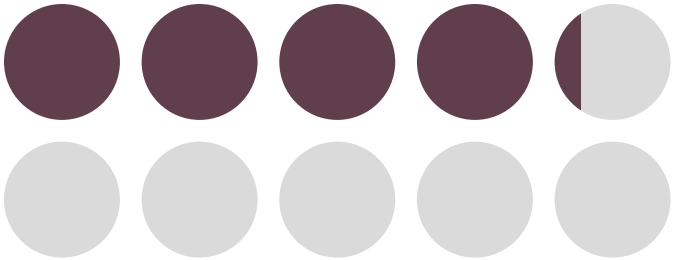
Mood disorders are a group of chronic conditions that affect people's moods or emotions (25). Some may feel "stuck" feeling down or sad, while others may experience extreme mood swings. It is normal to feel sad or to experience mood swings sometimes, but for people with mood disorders, these feelings can seriously affect their lives. Some examples of mood disorders include depression and bipolar disorder.

Anxiety involves worrying about or anticipating something that may or may not happen; it is a normal response to stress (26). For people with anxiety disorders, however, anxiety can make it hard to get through the day. Their fears or anxieties might seem out of proportion. Some examples of anxiety disorders include generalized anxiety disorder and panic disorder. This category also includes some conditions related to trauma and reactions to stress, such as post-traumatic stress disorder and acute stress reaction (see Appendix 5 for more information on limitations related to trauma).

> I see a lot of anxiety conditions in the adolescents I work with, almost to the point of panic attacks. And when you look at that, it's not your usual generalized anxiety disorder that you'd see in the general population. It's more post-traumatic stress disorder from trauma. When I do a history with clients, I often find that sometime during their early childhood they will either have witnessed trauma or experienced their own. Some of that trauma will be in the form of physical abuse and neglect, loss and grief of loved ones, or sexual abuse. Some will have all of those. And that's where—if there's no outlet, no care provided—people will be traumatized.
>
> —Mae Katt
> Nurse Practitioner
> Community Member, Temagami First Nation

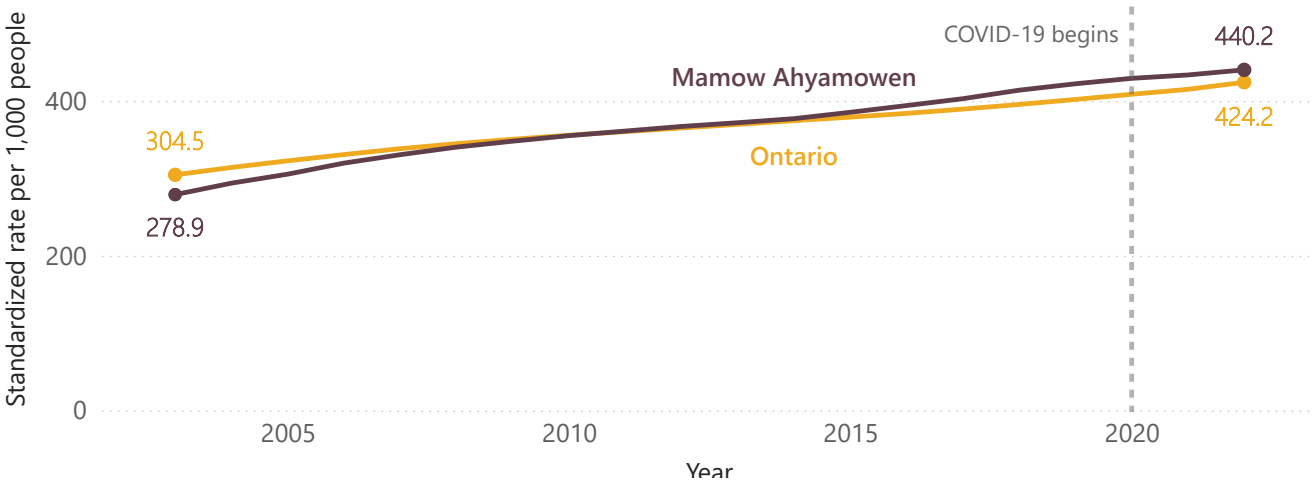
In 2019, the prevalence of mood and anxiety disorders for Mamow Ahyamowen was 422.2 cases per 1,000 people.

On average, this means that **just over 4 out of every 10** community members had experienced a mood or anxiety disorder at some point in their lives.



Prevalence of mood and anxiety disorders increased for Mamow Ahyamowen

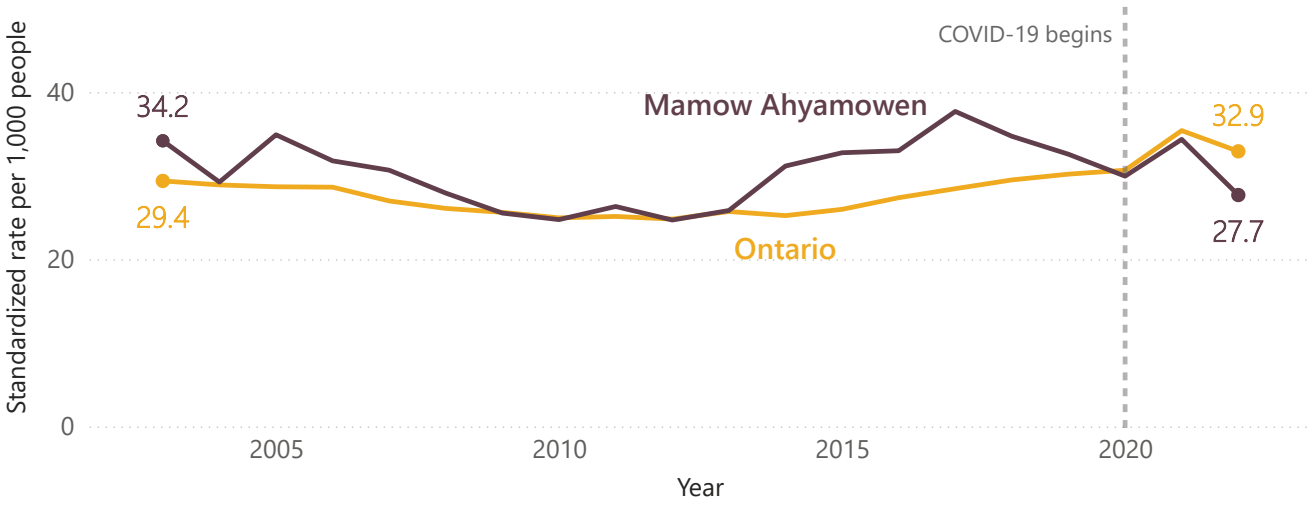
Graph 37. Prevalence of mood and anxiety disorders over time, 2003-2022



The prevalence of mood and anxiety disorders for Mamow Ahyamowen increased from 278.9 cases per 1,000 people in 2003 to 440.2 per 1,000 in 2022. The prevalence for Ontario overall started out slightly higher at 304.5 cases per 1,000 people in 2003, and followed a similar pattern over time, increasing to 424.2 per 1,000 people in 2022.

Incidence of mood and anxiety disorders decreased slightly for Mamow Ahyamowen

Graph 38. Incidence of mood and anxiety disorders over time, 2003-2022



The incidence of mood and anxiety disorders for Mamow Ahyamowen decreased slightly from 34.2 new cases per 1,000 people in 2003 to 27.7 per 1,000 in 2022. The incidence for Ontario overall started out slightly lower at 29.4 new cases per 1,000 people in 2003, and followed a different pattern over time, increasing slightly to 32.9 per 1,000 in 2022.

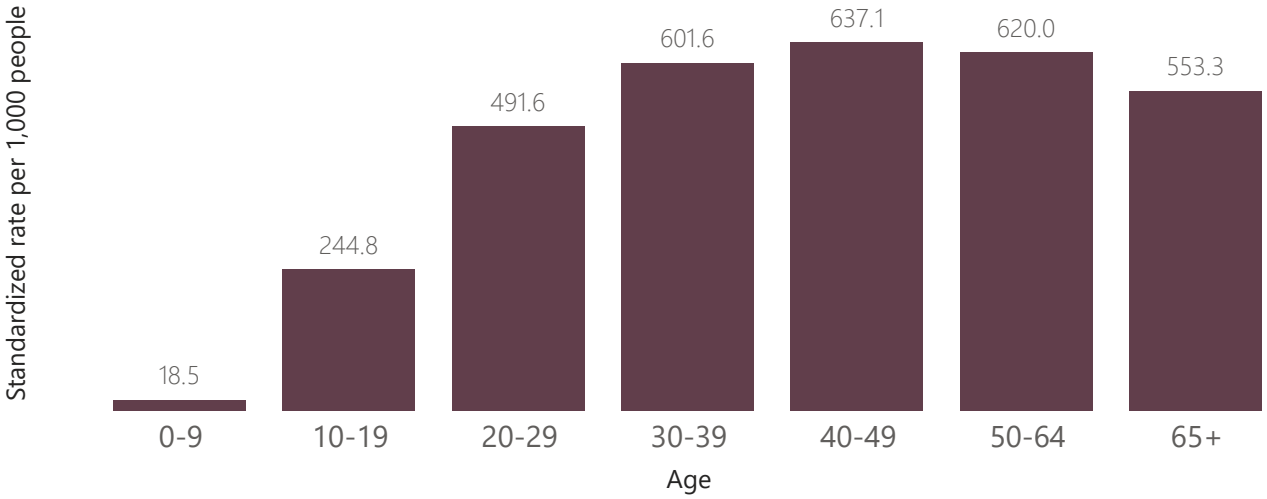
So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with mood or anxiety disorders each year. Together with the increase in prevalence, this could mean that community members with mood or anxiety disorders are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising even though there's less water flowing from the faucet. This could mean that less water is draining out of the tub.

Prevalence of mood and anxiety disorders was highest for community members aged 40-49

Graph 39. Prevalence of mood and anxiety disorders by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of mood and anxiety disorders in 2019 was higher for community members who were middle-aged. The prevalence was highest for community members aged 40 to 49 at 637.1 per 1,000 people, followed by those aged 50 to 64 at 620.0 per 1,000 people. On average, this means that over 6 out of every 10 community members in these age groups had experienced a mood or anxiety disorder by 2019.

When broken down by sex, the prevalence of mood and anxiety disorders in 2019 was **higher for female community members** compared to males.



488.9 cases per 1,000

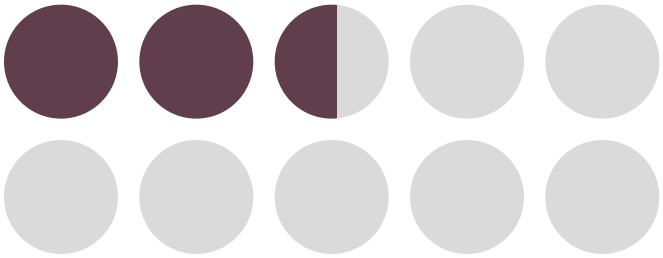
357.6 cases per 1,000

Substance Use Disorder

Substance use disorder is complex. Not everyone who uses substances has a substance use disorder. A basic distinguishing feature of a substance use disorder is when someone continues to use substances even though they know it's harming them (27). Their use might make it hard for them to function in day-to-day life. The term "substance" is broad and can include alcohol, opioids, cannabinoids, sedatives, stimulants, hallucinogens, commercial tobacco, and inhalants.

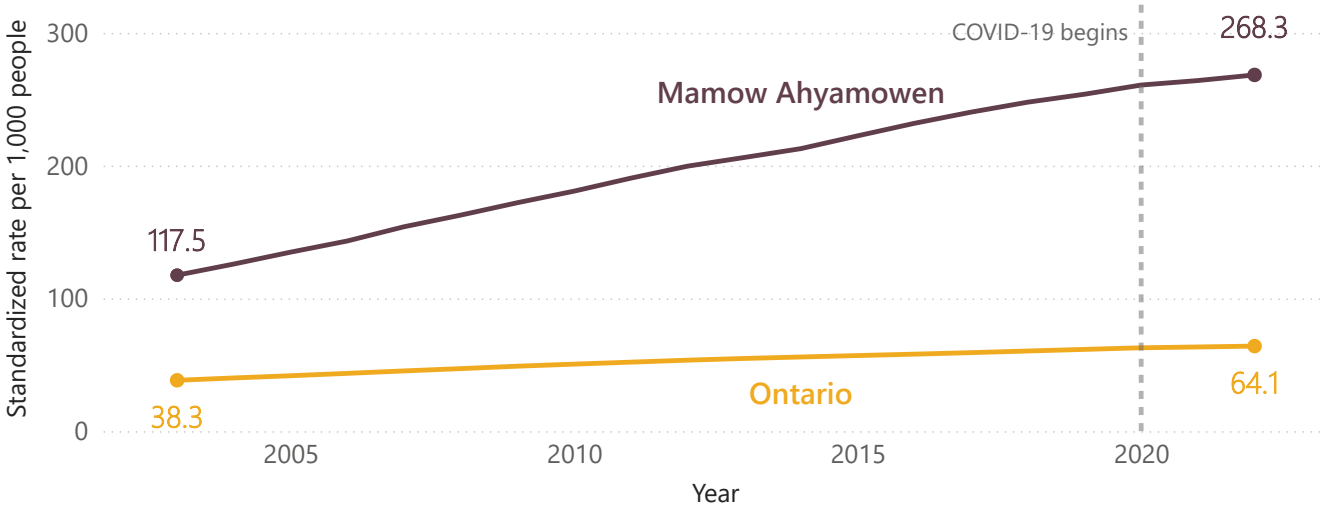
In 2019, the prevalence of substance use disorder for Mamow Ahyamowen was 253.8 cases per 1,000 people.

This means that **over 2 out of every 10** community members had experienced a substance use disorder at some point in their lives.



Prevalence of substance use disorder increased for Mamow Ahyamowen, more than doubling

Graph 40. Prevalence of substance use disorder over time, 2003-2022

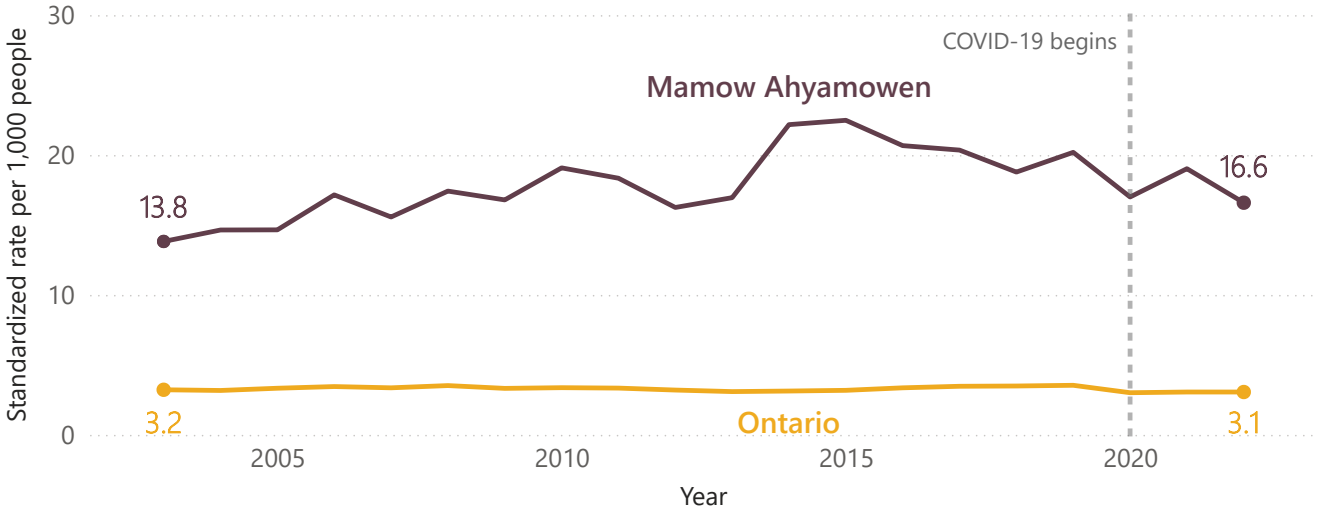


The prevalence of substance use disorder for Mamow Ahyamowen increased over time, more than doubling from 117.5 cases per 1,000 people in 2003 to 268.3 per 1,000 in 2022. The prevalence for Ontario overall was much lower, increasing from 38.3 cases per 1,000 people in 2003 to 64.1 per 1,000 in 2022.

In 2022, the prevalence of substance use disorder for Mamow Ahyamowen was 4.2 times that of Ontario overall.

Incidence of substance use disorder increased slightly for Mamow Ahyamowen

Graph 41. Incidence of substance use disorder over time, 2003-2022



The incidence of substance use disorder for Mamow Ahyamowen increased slightly from 13.8 new cases per 1,000 people in 2003 to 16.6 per 1,000 in 2022. The incidence for Ontario overall was much lower and didn't change a lot over time at 3.2 new cases per 1,000 people in 2003 and 3.1 per 1,000 in 2022.

In 2022, the incidence of substance use disorder for Mamow Ahyamowen was 5.4 times that of Ontario overall.

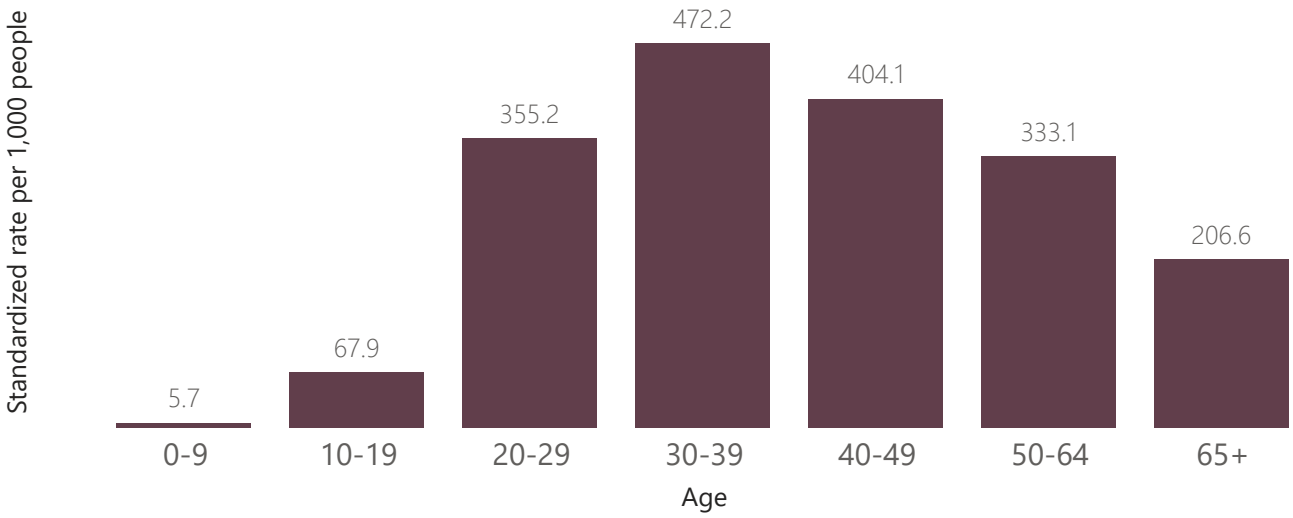
So What?

The increase in incidence that we observed for Mamow Ahyamowen suggests that more community members are being diagnosed with substance use disorder each year. Based on the increase in prevalence, it could also be that community members with substance use disorder are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising. We know that this is partly because more water is flowing from the faucet. It could also be that less water is draining out of the tub.

Prevalence of substance use disorder was highest for community members aged 30-39

Graph 42. Prevalence of substance use disorder by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of substance use disorder in 2019 was higher for community members who were middle aged. The prevalence was highest for community members aged 30 to 39, at 472.2 per 1,000 people, followed by those aged 40 to 49 at 404.1 per 1,000 people. On average, this means that almost 5 out of every 10 community members aged 30 to 39, or half, had experienced a substance use disorder as of 2019.

When broken down by sex, the prevalence of substance use disorder in 2019 was **similar for male and female community members**.



246.5 cases per 1,000 261.0 cases per 1,000

What We Heard

Event participants shared that many people turn to substance use as a way to cope with trauma and other challenges. When young people see this happening, they may be more likely to do it themselves. Also, the earlier people start using substances, the more likely they are to become dependent on those substances over time, which can create and worsen mental health issues. These factors feed into cycles within families and communities that are hard to break. Stigma is also a barrier when it comes to accessing treatment, especially in smaller communities. Finally, it is important to acknowledge that community members living with substance use disorder can be vulnerable to exploitation.

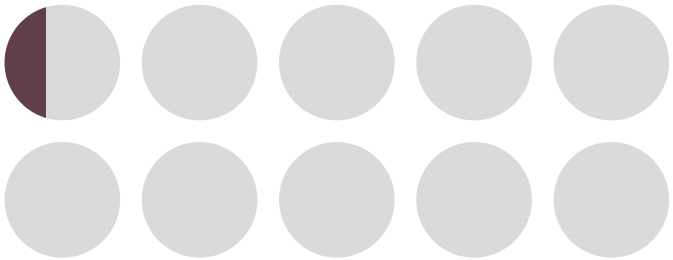
It is important to keep in mind that there are people living with this condition who may not seek care for their substance use or otherwise interact with the health care system. Furthermore, we did not have access to data from treatment and rehabilitation facilities or community-based services. As such, our findings likely underestimate the prevalence of substance use disorder. At the same time, it is also possible that some community members were misdiagnosed with substance use disorder due to common stereotypes and implicit biases about First Nations people (28).

Schizophrenia and Other Psychotic Disorders

The word "psychotic" is used to describe something that is related to psychosis. Psychosis makes it hard for people to tell what is real and what is not (29). Symptoms of psychosis vary from person to person, as do the length and frequency of psychotic episodes. While schizophrenia is one of the more well-known psychotic disorders, there are other mental illnesses that involve psychosis, such as delusional disorder and schizoaffective disorder.

In 2019, the prevalence of schizophrenia and other psychotic disorders for Mamow Ahyamowen was 35.4 per 1,000 people.

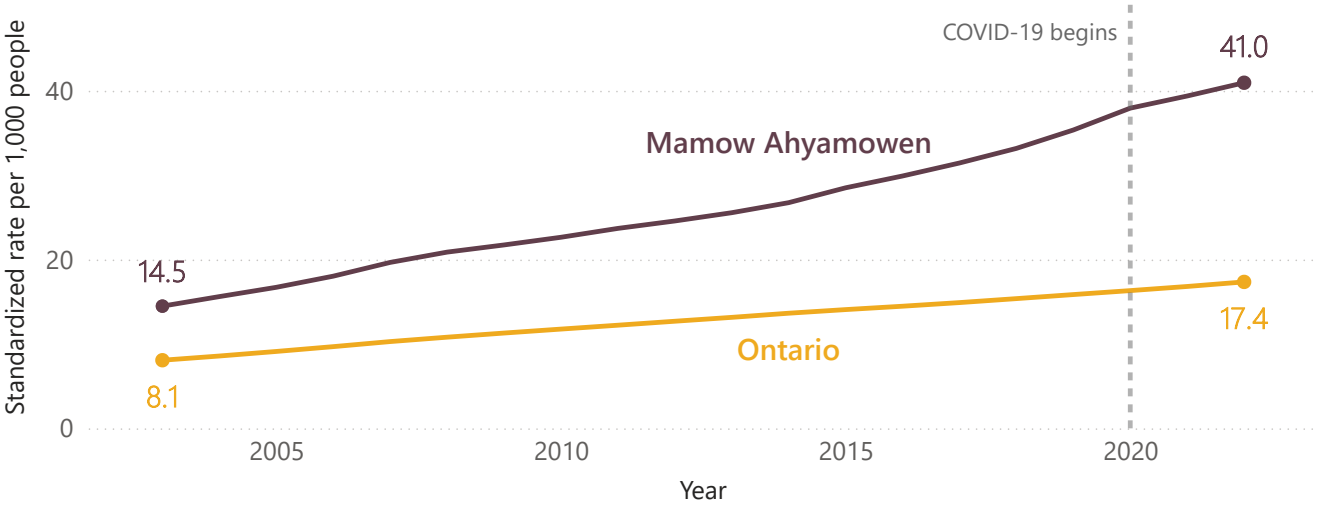
On average, this means that **fewer than 1 out of every 10** community members was living with schizophrenia or another type of psychotic disorder.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of schizophrenia and other psychotic disorders increased for Mamow Ahyamowen, almost tripling

Graph 43. Prevalence of schizophrenia and other psychotic disorders over time, 2003-2022

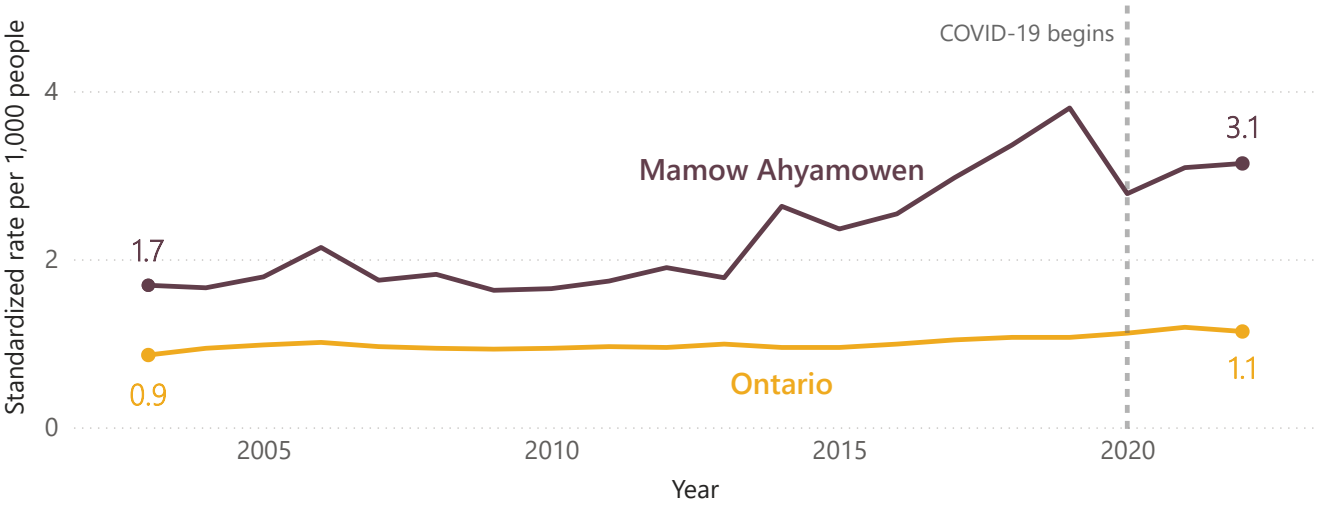


The prevalence of schizophrenia and other psychotic disorders for Mamow Ahyamowen nearly tripled over time, increasing from 14.5 cases per 1,000 people in 2003 to 41.0 per 1,000 in 2022. The prevalence for Ontario overall was lower, increasing more gradually from 8.1 cases per 1,000 people in 2003 to 17.4 per 1,000 in 2022.

In 2022, the prevalence of schizophrenia and other psychotic disorders for Mamow Ahyamowen was 2.4 times that of Ontario overall.

Incidence of schizophrenia and other psychotic disorders increased for Mamow Ahyamowen

Graph 44. Incidence of schizophrenia and other psychotic disorders over time, 2003-2022



The incidence of schizophrenia and other psychotic disorders for Mamow Ahyamowen increased from 1.7 new cases per 1,000 people in 2003 to 3.1 per 1,000 in 2022. The incidence for Ontario overall was lower but followed a similar pattern over time, increasing from 0.9 new cases per 1,000 people in 2003 to 1.1 per 1,000 in 2022.

In 2022, the incidence of schizophrenia and other psychotic disorders for Mamow Ahyamowen was 2.8 times that of Ontario overall.

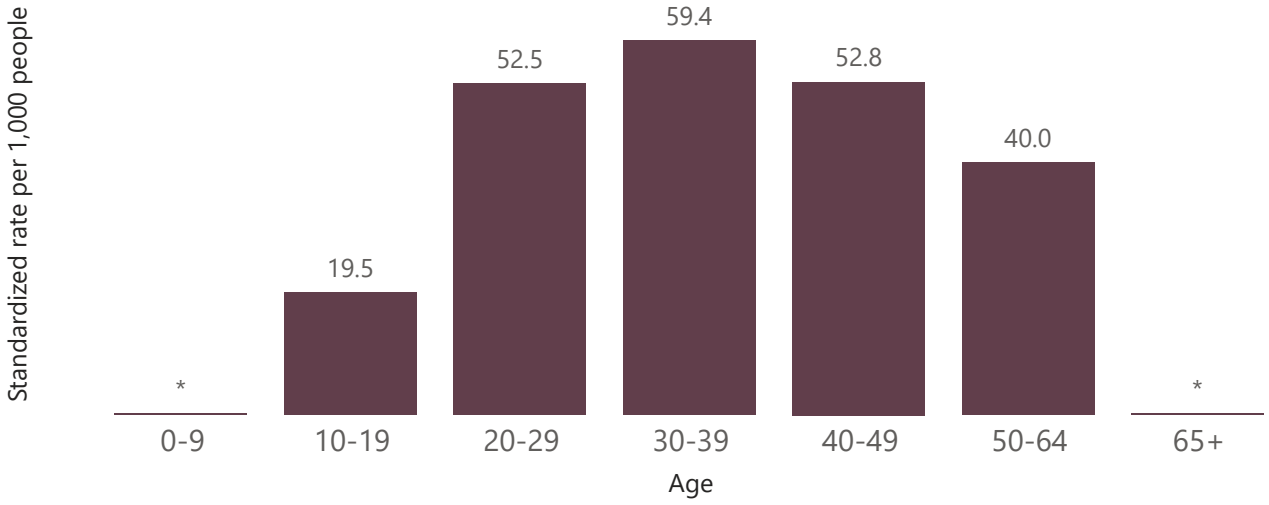
So What?

The increase in incidence that we observed for Mamow Ahyamowen suggests that more community members are being diagnosed with schizophrenia or other psychotic disorders each year. Based on the increase in prevalence, it could also be that community members with schizophrenia or other psychotic disorders are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising. We know that this is partly because more water is flowing from the faucet. It could also be that less water is draining out of the tub.

Prevalence of schizophrenia and other psychotic disorders was highest for community members aged 30-39

Graph 45. Prevalence of schizophrenia and other psychotic disorders by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of schizophrenia and other psychotic disorders in 2019 was higher in the middle age groups. The prevalence was highest for community members aged 30 to 39, at 59.4 per 1,000 people. This was followed by those aged 40 to 49 and 20 to 29, at 52.8 and 52.5 per 1,000 people, respectively.

When broken down by sex, the prevalence of schizophrenia and psychosis in 2019 was **higher for male community members** compared to females.



28.9 cases per 1,000



41.5 cases per 1,000

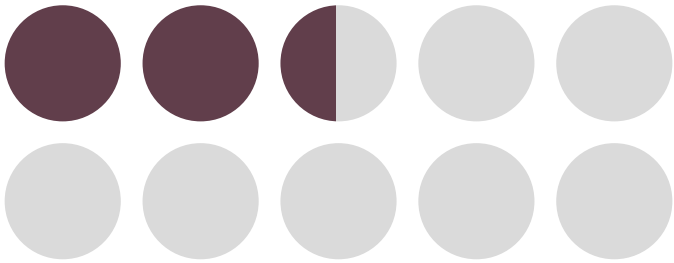


Other Mental Health Conditions

This category includes any mental health conditions other than mood and anxiety disorders, substance use disorder, and schizophrenia and other psychotic disorders. Examples include eating disorders, sleep disorders, and most types of personality disorders. We chose to group these conditions together because they tend to be less common, meaning that we would run into privacy issues if we tried to look at them individually.

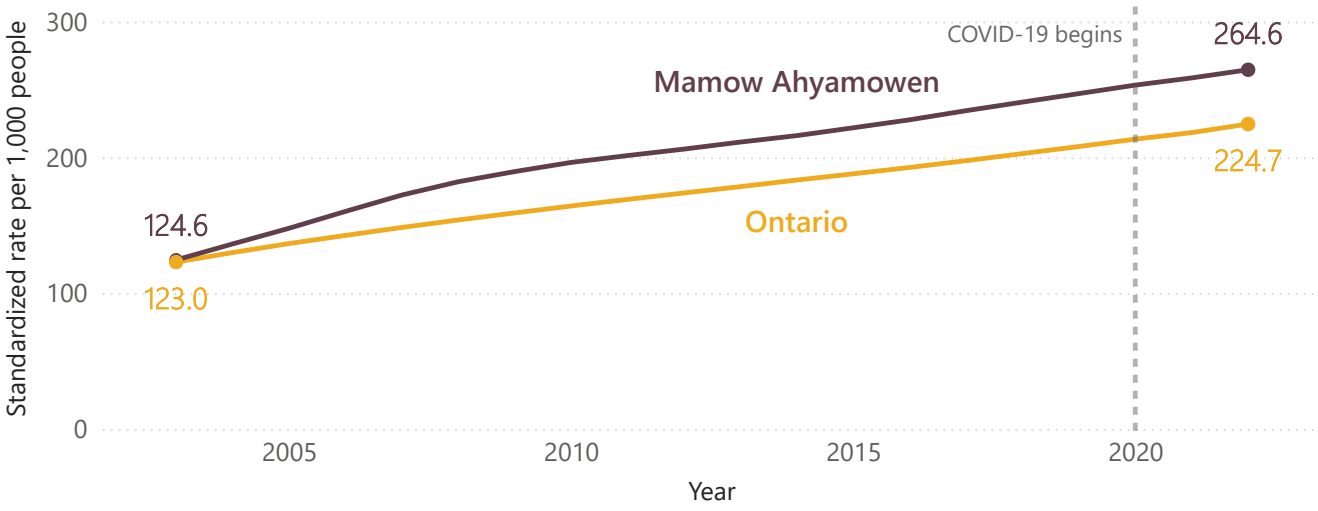
In 2019, the prevalence of other mental health conditions for Mamow Ahyamowen was 247.0 cases per 1,000 people.

On average, this means that **more than 2 out of every 10** community members had experienced other mental health conditions at some point in their lives.



Prevalence of other mental health conditions increased for Mamow Ahyamowen, more than doubling

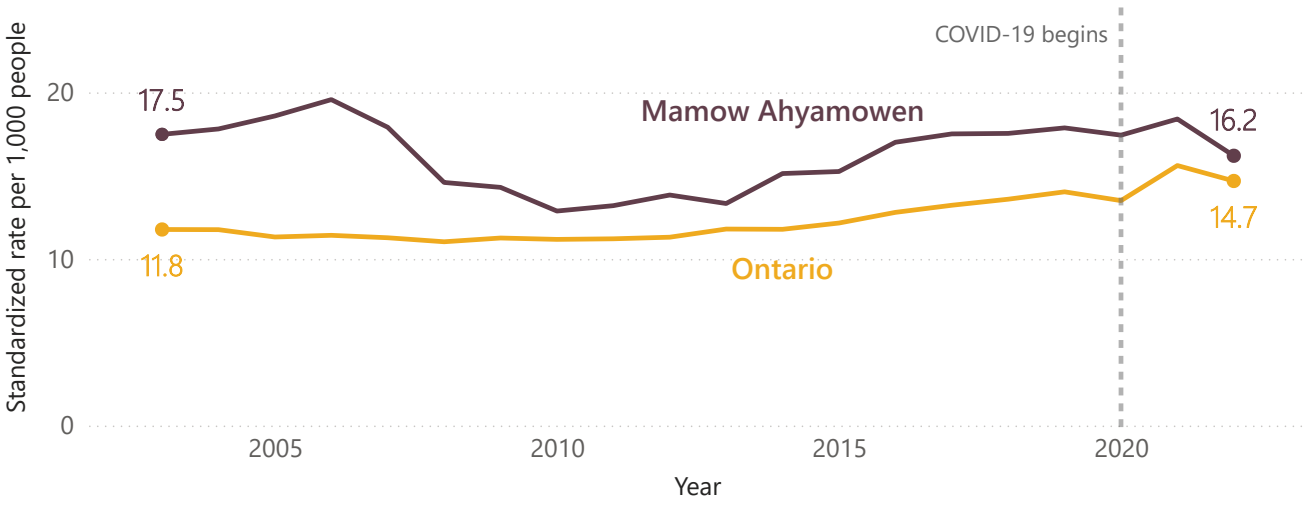
Graph 46. Prevalence of other mental health conditions over time, 2003-2022



The prevalence of other mental health conditions for Mamow Ahyamowen more than doubled over time, increasing from 124.6 cases per 1,000 people in 2003 to 264.6 per 1,000 in 2022. The prevalence for Ontario overall started out similarly at 123.0 cases per 1,000 people in 2003, increasing a bit more gradually to 224.7 per 1,000 in 2022.

Incidence of other mental health conditions decreased slightly for Mamow Ahyamowen

Graph 47. Incidence of other mental health conditions over time, 2003-2022



The incidence of other mental health conditions for Mamow Ahyamowen decreased slightly from 17.5 new cases per 1,000 people in 2003 to 16.2 per 1,000 in 2022. The incidence for Ontario overall was lower and followed a different pattern over time, increasing from 11.8 new cases per 1,000 people in 2003 to 14.7 per 1,000 in 2022.

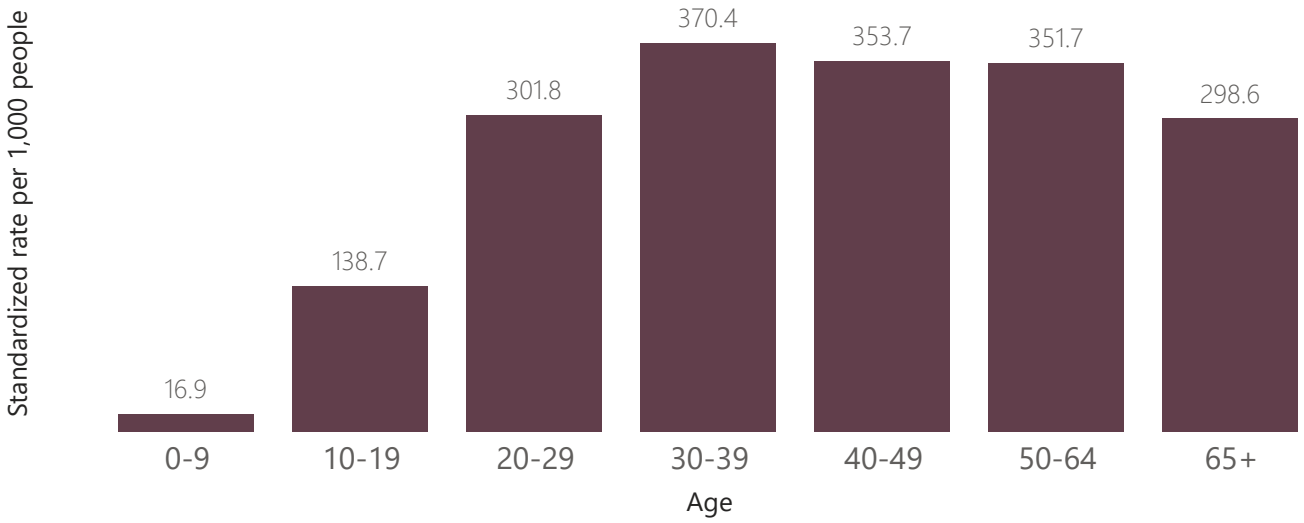
So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with other mental health conditions each year. Together with the increase in prevalence, this could mean that community members with other mental health conditions are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising even though there's less water flowing from the faucet. This could mean that less water is draining out of the tub.

Prevalence of other mental health conditions was highest for community members aged 30-39

Graph 48. Prevalence of other mental health conditions by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of other mental health conditions in 2019 was higher in community members who were middle aged. The prevalence was highest for community members aged 30 to 39, at 370.4 per 1,000 people. This was followed by those aged 40 to 49 and 50 to 64, at 353.7 and 351.7 per 1,000 people, respectively.

When broken down by sex, the prevalence of other mental health conditions in 2019 was **higher for female community members** compared to males.



282.1 cases per 1,000

213.2 cases per 1,000



Diabetes and Related Conditions

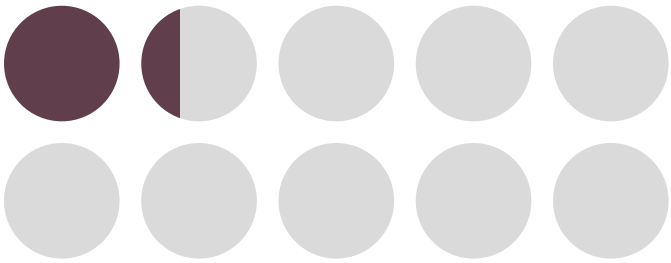
Diabetes is a chronic condition that can affect various systems within the body, including the renal system, which filters the blood by removing waste and excess water from the body (30). Diabetes is a common cause of kidney disease (31).

Diabetes

The body turns food into energy using insulin. Diabetes is a chronic condition that affects its ability to make or control insulin (32). If diabetes is not managed, it can cause serious health problems. There are three types of diabetes: type 1, type 2, and gestational. These findings do not include gestational diabetes.

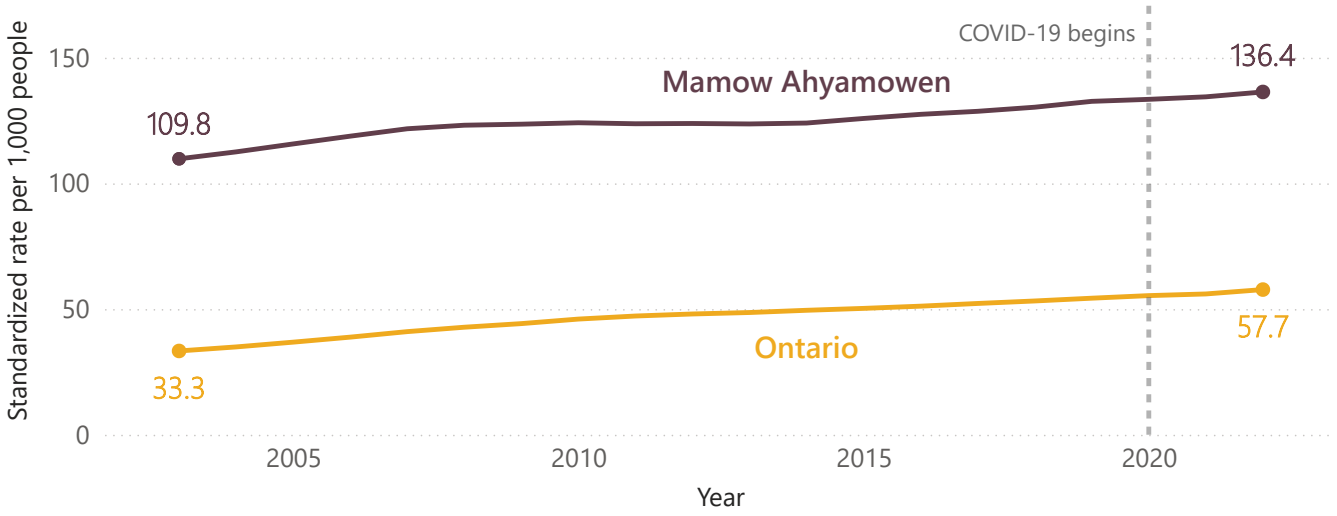
In 2019, the prevalence of diabetes for Mamow Ahyamowen was 132.6 cases per 1,000 people.

On average, this means that **just over 1 out of every 10** community members were living with diabetes.



Prevalence of diabetes increased for Mamow Ahyamowen

Graph 49. Prevalence of diabetes over time, 2003-2022

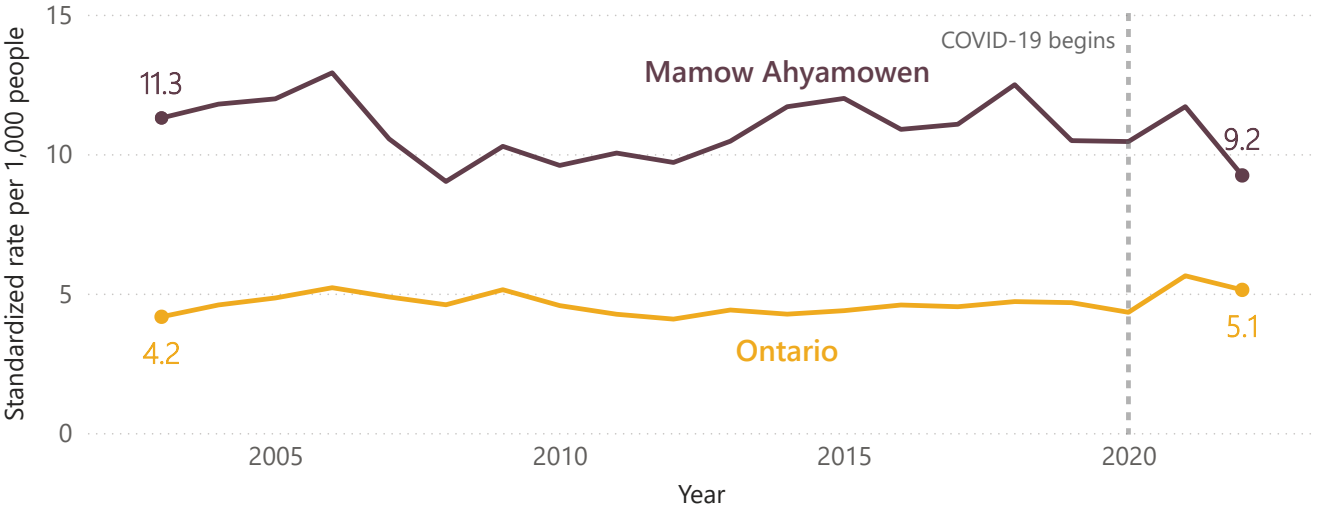


The prevalence of diabetes for Mamow Ahyamowen increased from 109.8 cases per 1,000 people in 2003 to 136.4 per 1,000 in 2022. The prevalence for Ontario overall was much lower but increased at a slightly faster rate from 33.3 cases per 1,000 people in 2003 to 57.7 per 1,000 in 2022.

In 2022, the prevalence of diabetes for Mamow Ahyamowen was 2.4 times that of Ontario overall.

Incidence of diabetes decreased slightly for Mamow Ahyamowen

Graph 50. Incidence of diabetes over time, 2003-2022



The incidence of diabetes for Mamow Ahyamowen decreased slightly from 11.3 new cases per 1,000 people in 2003 to 9.2 per 1,000 in 2022. There was some fluctuation in these rates over time. This

is probably because the Mamow Ahyamowen population is relatively small, meaning that small changes in the number of people being diagnosed with this condition might have a bigger impact. The incidence for Ontario overall started out much lower and followed a different pattern over time, increasing from 4.2 new cases per 1,000 people in 2003 to 5.1 per 1,000 in 2022.

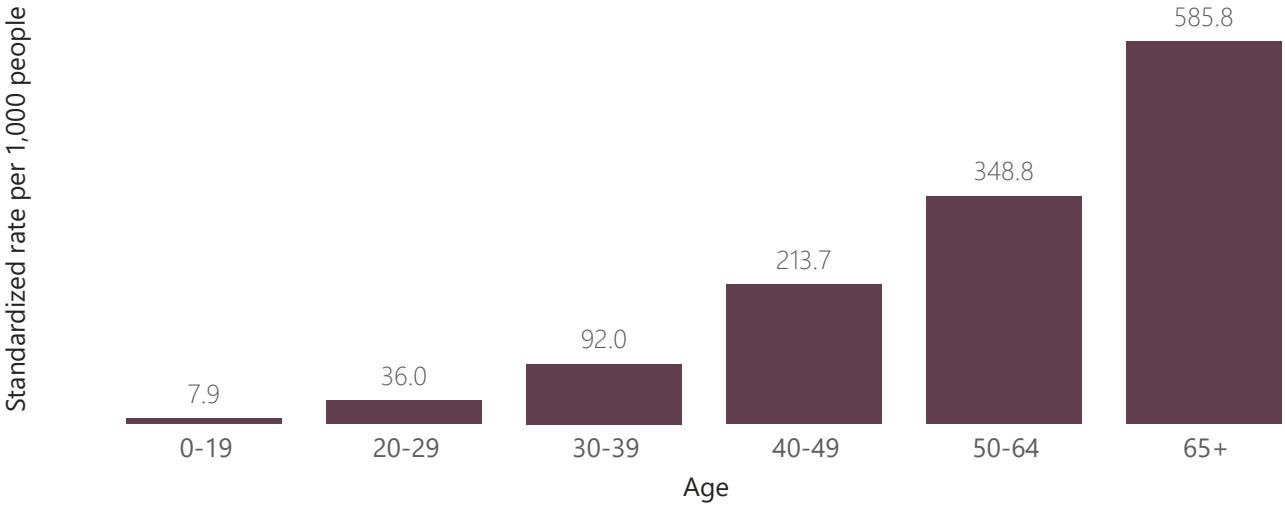
So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with diabetes each year. Together with the increase in prevalence, this could mean that community members with diabetes are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising even though there's less water flowing from the faucet. This could mean that less water is draining out of the tub.

Prevalence of diabetes was highest for community members aged 65+

Graph 51. Prevalence of diabetes by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of diabetes in 2019 was highest for community members aged 65 and over, at 585.8 per 1,000 people. On average, this means that almost 6 out of every 10 community members in this age group—more than half—were living with diabetes by 2019.

When broken down by sex, the prevalence of diabetes in 2019 was **slightly higher for female community members** compared to males.



143.8 cases per 1,000

121.9 cases per 1,000



What We Heard

According to event participants, diabetes is a concern for many Mamow Ahyamowen communities. It is important to note that our findings don't include cases of pre-diabetes. Furthermore, they don't distinguish between type 1 and type 2 diabetes, which would provide important information for program planning and evaluation. This is particularly important in the context of children and youth, as the people we spoke with were concerned about the early onset of type 2 diabetes.

Managing diabetes is often complex. People living with diabetes may also have other health conditions, which can make it harder for them to manage. A good example of this is substance use disorder. It can take a lot for people to change their lifestyles and adopt healthier behaviours, especially when they are facing systemic barriers like food insecurity, as touched on in the quote below. Sometimes, they might not do so until their symptoms get very serious. Without proper management, diabetes can lead to serious complications like amputation, blindness, and renal failure.

Several community-based programs have arisen in response to the increase in diabetes in First Nations communities. One example is the Aboriginal Diabetes Initiative, which was established in 1999 to reduce type 2 diabetes among First Nations and Inuit people by supporting health promotion and primary prevention activities (33). There are also many nutrition programs that aim to improve access to healthy foods. Finally, there is currently a growing movement around traditional foods, which contribute to a healthier diet and increase cultural connection. However, these types of programs are usually dependent on government funding, which is not always available. For example, the people we spoke with believed that funding cuts to diabetes programming at the federal level from 2008 to 2015 may have contributed to increases in the incidence and prevalence of diabetes. Furthermore, many of these programs still need to be evaluated to understand their true impact.

> You end up making a lot of concessions when you're doing diabetes education in the north, where there are so many barriers. Maybe you tell people to try to cut down the amount of sugar you put in your coffee or to buy frozen vegetables cause they're a little cheaper than the fresh ones. Buy fruit that's packed in water and not in juice. So you try to work with people, which is fine if you've worked in the region. But we see a lot more contract employees coming up from southern Ontario who don't have that context.

—David De La Fosse, RN, BScN
Clinical Manager
Independent First Nations Alliance



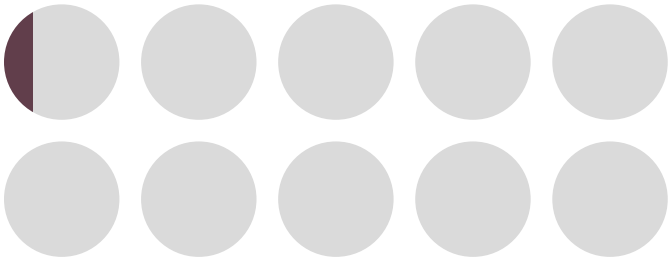
Kidney Failure

Kidneys have several important jobs, including removing waste—or things your body doesn't need—from the blood (34,35). When the kidneys become damaged and can't do this properly, it is called kidney failure, also known as renal failure. This can be acute, only lasting a few days or weeks, or chronic. Chronic kidney failure happens slowly over a period of months or years and can have serious health impacts.

> As the years went on, I kept going to the hospital. Every time the people from Kingston came down—the nephrologists, I guess—they called me in for an appointment because of the protein in my urine. But all those years, they never told me what it meant. I only learned after, when I found out I was going into kidney failure. I read about the elevation of the proteins in urine, which causes kidney failure. I wish somebody would've told me, just one person...I would've done something about it.
>
> —Anonymous Community Member

In 2019, the prevalence of kidney failure for Mamow Ahyamowen was 24.4 cases per 1,000 people.

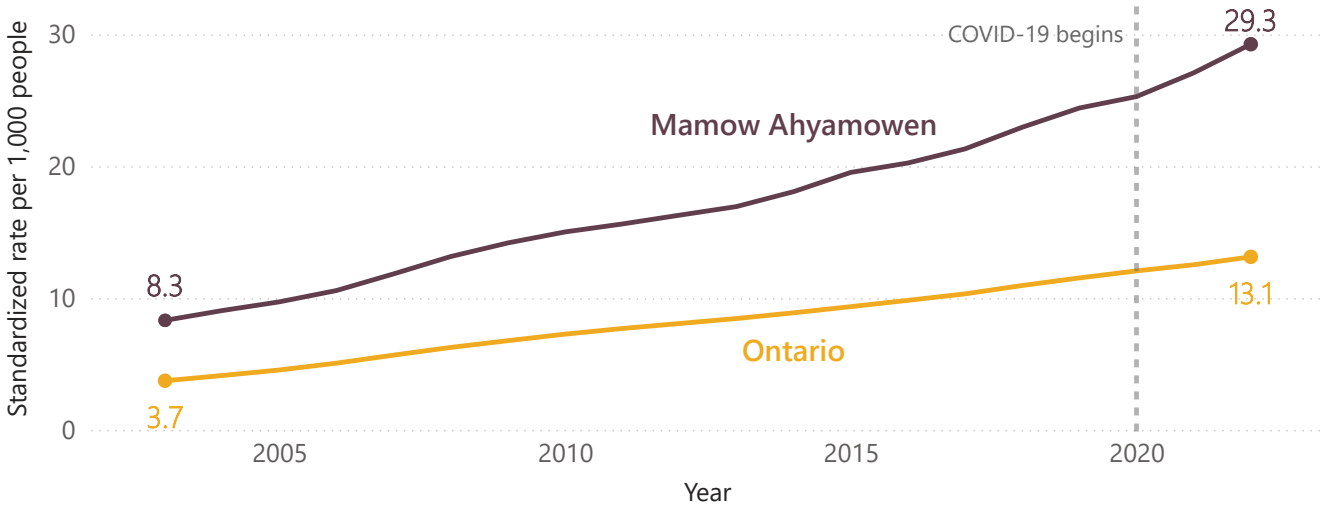
On average, this means that **fewer than 1 out of every 10** community members had experienced kidney failure.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of kidney failure increased dramatically for Mamow Ahyamowen, more than tripling

Graph 52. Prevalence of kidney failure over time, 2003-2022

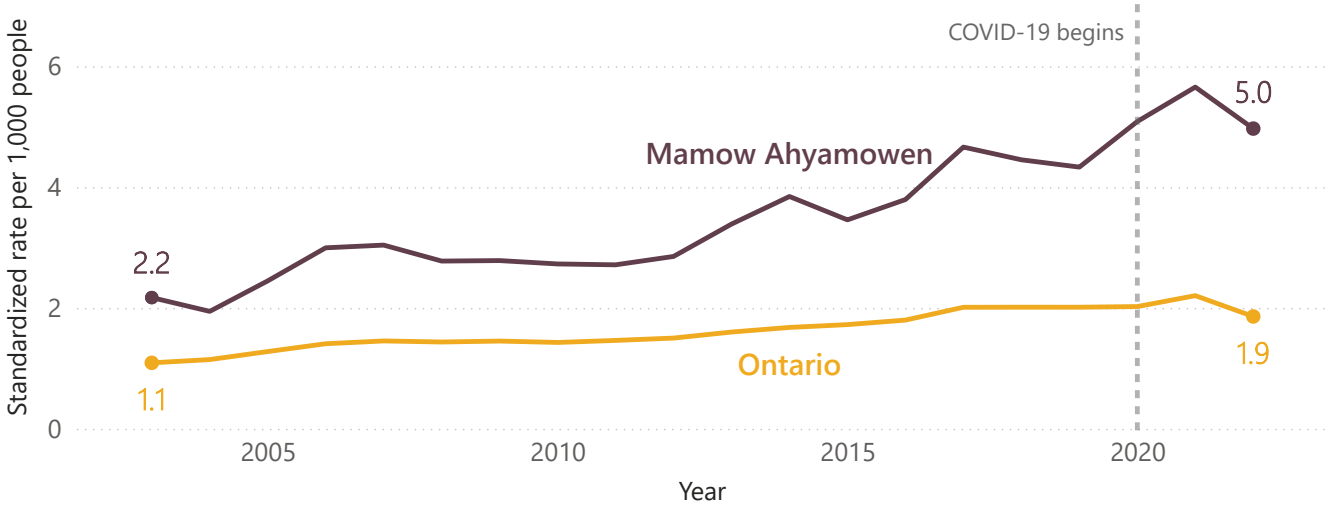


The prevalence of kidney failure for Mamow Ahyamowen increased dramatically, more than tripling from 8.3 cases per 1,000 people in 2003 to 29.3 per 1,000 in 2022. The prevalence of Ontario overall was much lower but followed a similar pattern over time, more than tripling from 3.7 cases per 1,000 people in 2003 to 13.1 per 1,000 in 2022.

In 2022, the prevalence of kidney failure for Mamow Ahyamowen was more than double that of Ontario overall.

Incidence of kidney failure increased for Mamow Ahyamowen, more than doubling

Graph 53. Incidence of kidney failure over time, 2003-2022



The incidence of kidney failure for Mamow Ahyamowen increased over time, more than doubling from 2.2 new cases per 1,000 people in 2003 to 5.0 per 1,000 in 2022. There was some fluctuation in these rates over time. This is probably because the Mamow Ahyamowen population is relatively small, meaning that small changes in the number of people being diagnosed with this condition have a bigger impact. The incidence for Ontario overall was lower and increased a bit more gradually from 1.1 new cases per 1,000 people in 2003 to 1.9 per 1,000 in 2022.

In 2022, the incidence of kidney failure for Mamow Ahyamowen was 2.6 times that of Ontario overall.

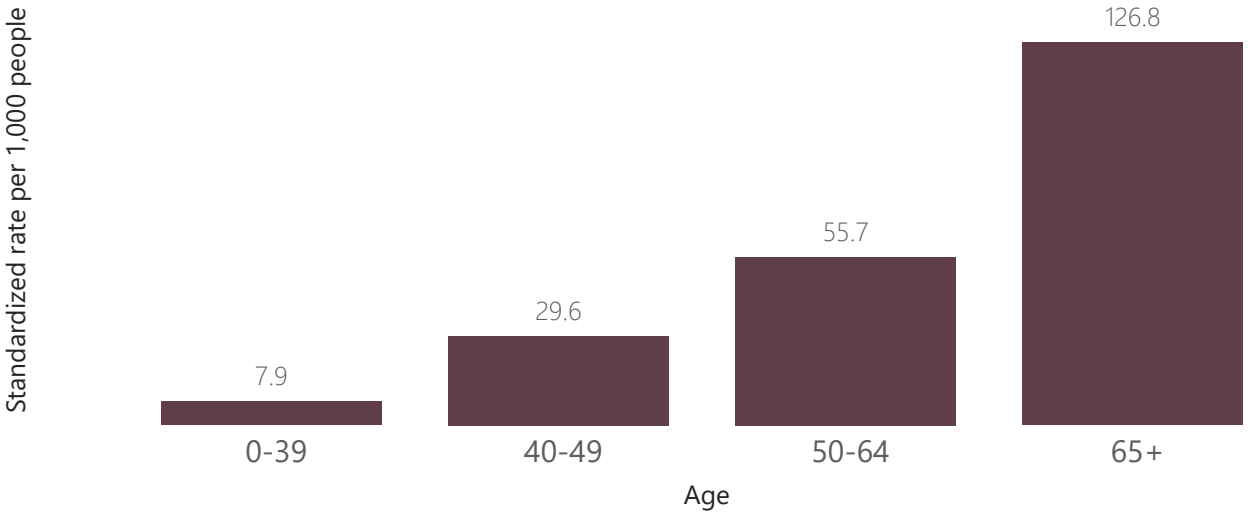
So What?

The increase in incidence that we observed for Mamow Ahyamowen suggests that more community members are being diagnosed with kidney failure each year. Based on the increase in prevalence, it could also be that community members with kidney failure are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising. We know that this is partly because more water is flowing from the faucet. It could also be that less water is draining out of the tub.

Prevalence of kidney failure was highest for community members aged 65+

Graph 54. Prevalence of kidney failure by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of kidney failure in 2019 was highest for community members aged 65 and over, at 126.8 per 1,000 people.

When broken down by sex, the prevalence of kidney failure in 2019 was **slightly higher for female community members** compared to males.



25.6 cases per 1,000 23.4 cases per 1,000

What We Heard

Event participants noted that providing care for people living with kidney failure is a challenge in many Mamow Ahyamowen communities. Most do not have the equipment to offer dialysis, which is the best way of treating chronic kidney failure aside from transplantation. Dialysis also requires access to clean water, which is not available in some First Nations across northern Ontario. This means that people living with chronic kidney failure have to travel regularly to larger centers to receive care. Those from remote communities may have to relocate altogether, which comes with significant barriers and stressors, negatively impacting the mental, emotional, spiritual, and financial wellbeing of those with chronic kidney failure as well as their friends and family. Long waitlists are also an issue.

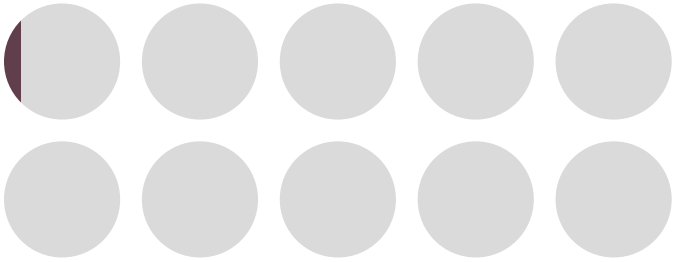


Dementia

Dementia is a chronic condition that affects the brain, making it hard to remember, think, and learn (36). This condition tends to affect older adults starting around the age of 65. Dementia is usually progressive, meaning it gets worse over time. Most dementia is caused by Alzheimer disease, but there can be other causes too. For example, blocked blood vessels in the brain can cause vascular dementia.

In 2019, the prevalence of dementia for Mamow Ahyamowen was 14.0 cases per 1,000 people. When limited to community members aged 65 and older, the prevalence was 62.0 cases per 1,000 people.

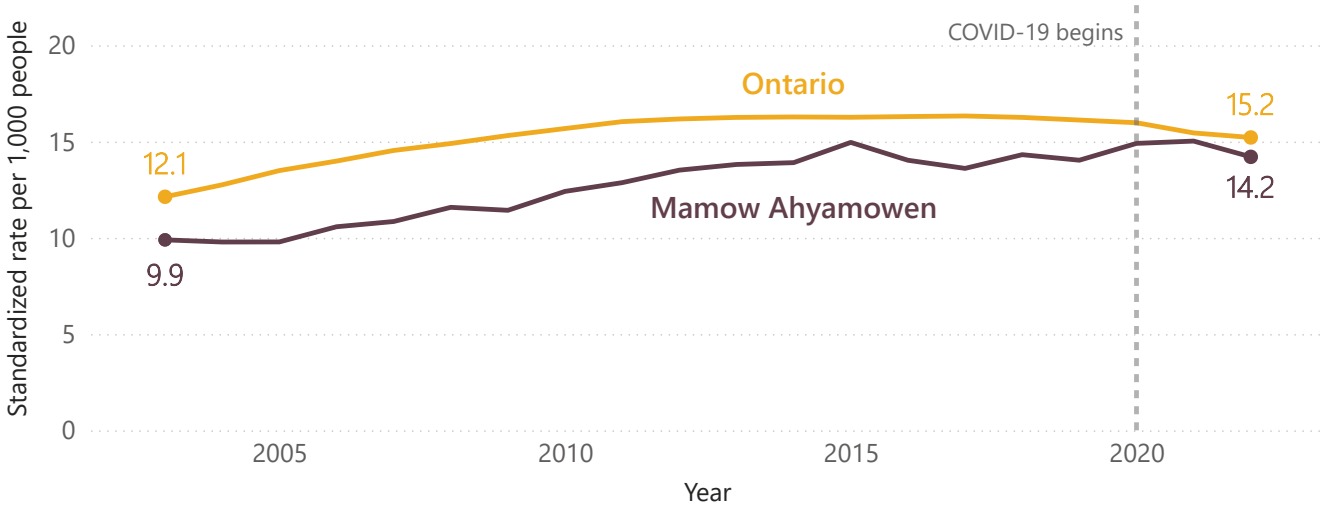
On average, this means that **fewer than 1 out of every 10** community members was living with dementia.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of dementia increased for Mamow Ahyamowen

Graph 55. Prevalence of dementia over time, 2003-2022



The prevalence of dementia for Mamow Ahyamowen increased from 9.9 cases per 1,000 people in 2003 to 14.2 per 1,000 in 2022. There was some fluctuation in these rates over time. This is probably because the Mamow Ahyamowen population is relatively small, meaning that small changes in the number of people living with this condition have a bigger impact. The prevalence for Ontario overall was slightly higher and increased a bit more gradually from 12.1 cases per 1,000 people in 2003 to 15.2 per 1,000 in 2022.

The incidence of dementia for Mamow Ahyamowen didn't change a lot over time, at 2.7 new cases per 1,000 people in both 2003 and 2022 (figure not shown). The incidence for Ontario overall started out higher and followed a very different pattern over time, decreasing from 3.4 new cases per 1,000 people in 2003 to 1.9 per 1,000 in 2022.

So What?

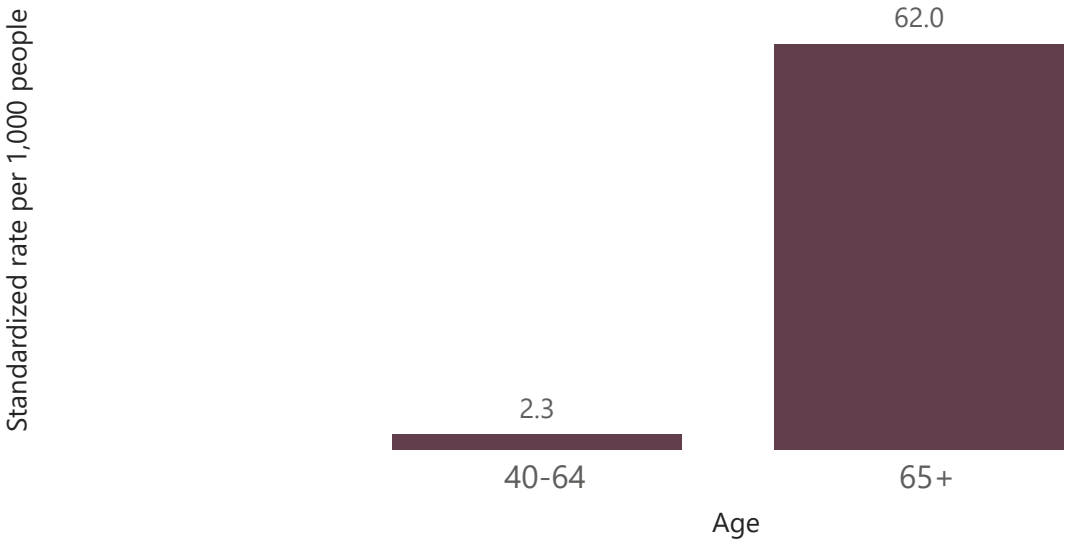
The incidence for Mamow Ahyamowen hasn't changed a lot over time, which suggests that around the same proportion of community members are being diagnosed with dementia each year. Together with the increase in prevalence, this could mean that community members with dementia are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising even though the amount of water flowing from the faucet hasn't changed very much. This could mean that less water is draining out of the tub.

These findings likely underestimate the prevalence of dementia for Mamow Ahyamowen community members. The criteria for the algorithms that we used to detect dementia are very strict and do not reflect the realities of health care in northern Ontario. For example, one of the criteria says that someone must have accessed an OHIP-funded service for which a diagnosis of dementia was recorded at least three times, at least thirty days apart within a two-year period (see Appendix 3 for more information on these criteria). Since access to health care is so limited in our region, particularly in remote communities, it is likely that there are people living with dementia who won't meet this criterion and therefore won't be picked up in the datasets.

Prevalence of dementia was higher for community members aged 65+

Graph 56. Prevalence of dementia by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of dementia in 2019 was higher for community members aged 65 and over, at 62.0 per 1,000 people. This aligns with what we know about dementia, which tends to affect older adults.

When broken down by sex, the prevalence of dementia in 2019 was **higher for female community members** compared to males.



15.5 cases per 1,000 12.3 cases per 1,000

What We Heard

Event participants shared that, like in the general population, the aging baby boomer generation in Mamow Ahyamowen communities could be a part of increasing dementia rates. This group of people is reaching an age where dementia is more common. Additionally, while our findings do show an increase in the prevalence of dementia, we could be missing cases. Dementia can go undiagnosed, especially in remote communities where access to health care is limited. It could also be misdiagnosed as something like delirium, as the signs and symptoms are similar.

Caring for community members with dementia can be challenging. There aren't a lot of services for people with this condition, and those that do exist are usually not community based. Instead, many communities rely on informal support from family and neighbours, which is not always enough and can be very hard on people. People who need long-term care often end up moving to bigger centers, as most communities don't have these types of facilities. Moreover, the care people receive in facilities far from home is not always culturally appropriate. Many of these issues are related to a lack of funding.

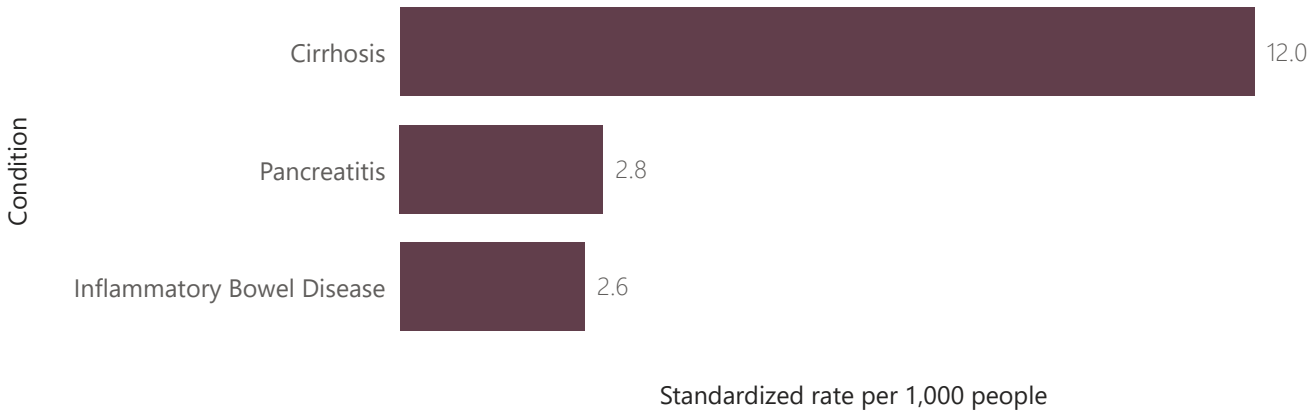


Gastrointestinal Conditions

Gastrointestinal conditions affect the organs that help with digesting or breaking down food. This process provides the body with nutrients for energy, growth, and cell repair (37).

Cirrhosis was most prevalent gastrointestinal condition for Mamow Ahyamowen

Graph 57. Gastrointestinal conditions by prevalence, Mamow Ahyamowen, 2019



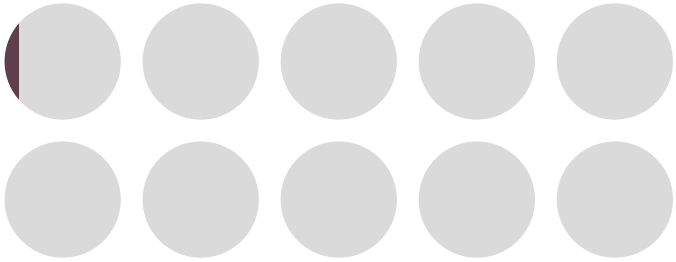
In general, the prevalence of gastrointestinal conditions was low. Of all the gastrointestinal conditions we looked at, cirrhosis was the most prevalent for Mamow Ahyamowen community members in 2019, at 12.0 per 1,000 people. Pancreatitis and inflammatory bowel disease were less common, relatively speaking, at 2.8 and 2.6 per 1,000 people, respectively.

Cirrhosis

Cirrhosis happens when the liver is damaged over a long period of time, which causes scar tissue to replace healthy liver tissue (38). If it becomes severe or if left untreated, cirrhosis can lead to serious problems such as liver failure and liver cancer.

In 2019, the prevalence of cirrhosis for Mamow Ahyamowen was 12.0 cases per 1,000 people.

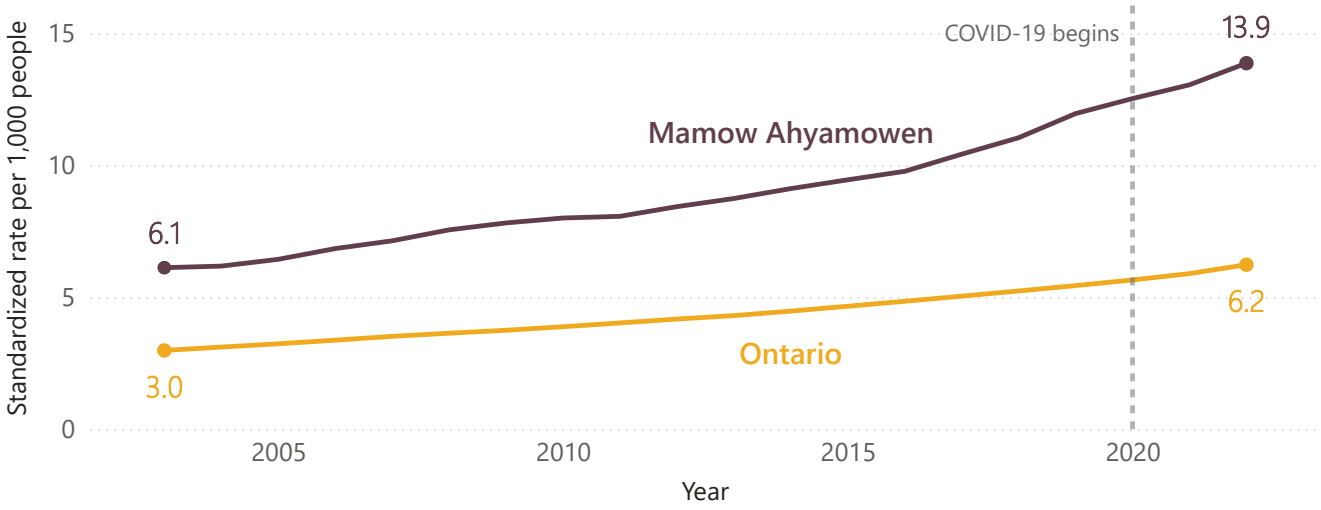
On average, this means that **fewer than 1 out of every 10** community members was living with cirrhosis.



While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of cirrhosis increased for Mamow Ahyamowen, more than doubling

Graph 58. Prevalence of cirrhosis over time, 2003-2022

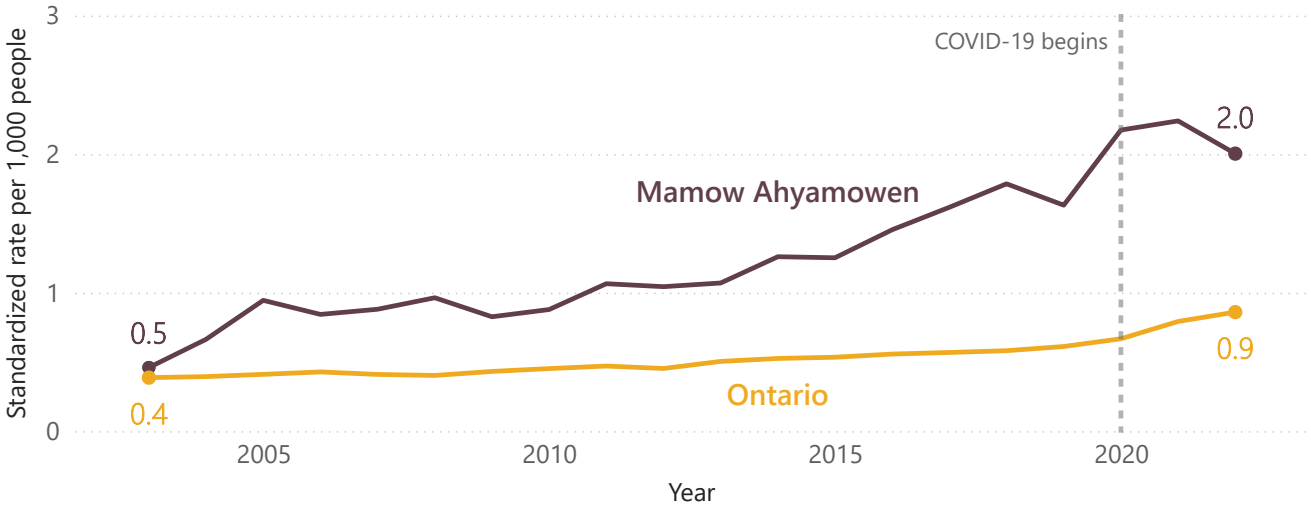


The prevalence of cirrhosis for Mamow Ahyamowen increased over time, more than doubling from 6.1 cases per 1,000 people in 2003 to 13.9 per 1,000 in 2022. The prevalence for Ontario overall was much lower but followed a similar pattern over time, more than doubling from 3.0 cases per 1,000 people in 2003 to 6.2 per 1,000 in 2022.

In 2022, the prevalence of cirrhosis for Mamow Ahyamowen was more than double that of Ontario overall.

Incidence of cirrhosis increased dramatically for Mamow Ahyamowen, more than quadrupling

Graph 59. Incidence of cirrhosis over time, 2002-2003



The incidence of cirrhosis for Mamow Ahyamowen increased dramatically over time, quadrupling from 0.5 new cases per 1,000 people in 2003 to 2.0 per 1,000 in 2022. The incidence for Ontario overall was lower and increased more gradually from 0.4 new cases per 1,000 people in 2003 to 0.9 per 1,000 in 2022.

In 2022, the incidence of cirrhosis for Mamow Ahyamowen was more than double that of Ontario ovreall.

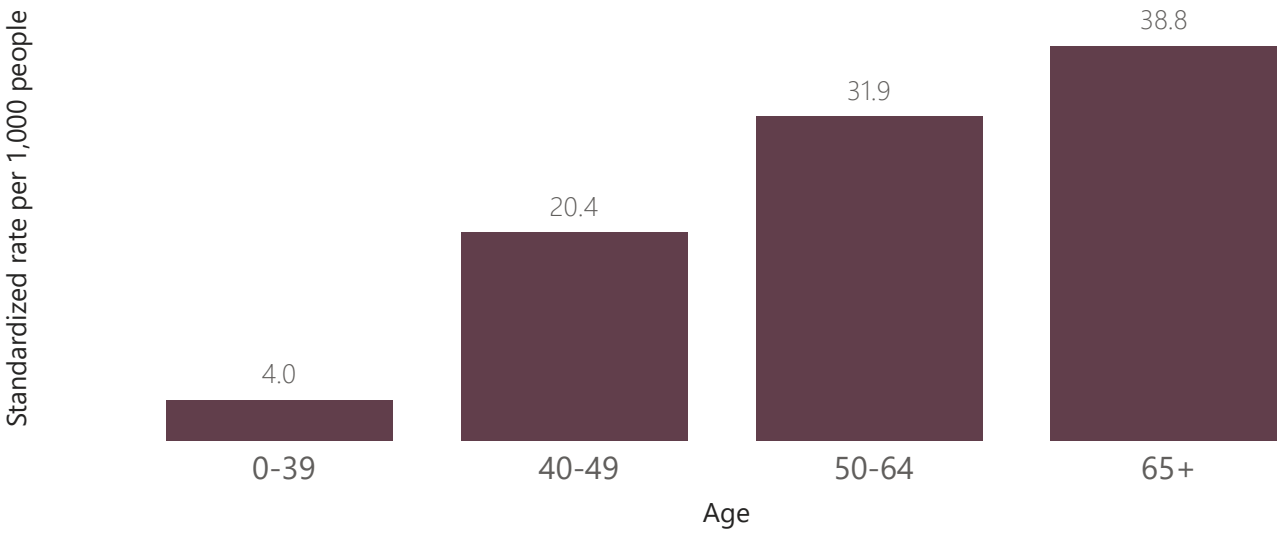
So What?

The increase in incidence that we observed for Mamow Ahyamowen suggests that more community members are being diagnosed with cirrhosis each year. Based on the increase in prevalence, it could also be that community members with cirrhosis are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising. We know that this is partly because more water is flowing from the faucet. It could also be that less water is draining out of the tub.

Prevalence of cirrhosis was highest for community members aged 65+

Graph 60. Prevalence of cirrhosis by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of cirrhosis in 2019 was highest for community members aged 65 and over, at 38.8 per 1,000 people.

When broken down by sex, the prevalence of cirrhosis in 2019 was **higher for female community members** compared to males.



13.8 cases per 1,000 10.2 cases per 1,000

What We Heard

Event participants noted that alcohol use can play a role in the development of cirrhosis, as touched on in the quote below. This is important to keep in mind given the realities of substance use in many Mamow Ahyamowen communities. Alcohol use is also relevant to the treatment of cirrhosis. In order to receive a liver transplant, potential recipients are usually required to stop using alcohol. This can be very difficult for some people, particularly those who use alcohol to cope with intergenerational trauma (see Substance Use Disorder).

However, it is also important to note that alcohol use is not the only cause. Metabolic dysfunction-associated steatotic liver disease (formerly known as nonalcoholic fatty liver disease), hepatitis C, and the use of certain medications can also lead to cirrhosis. For women, hormonal changes can also play a role. Barriers to primary care such as long wait times, provider shortages, and provider biases could be making it harder for community members to be diagnosed with cirrhosis.

> What we're seeing is that a diagnosis of cirrhosis isn't motivating people to quit drinking. I don't know if they don't believe the doctors or if the addiction is just that strong, but a lot of people continue to drink and ultimately pass. So it's not long after they're diagnosed that they're not here anymore. The addiction is like self-soothing, numbing behaviour…there's been a lot of trauma systemically, within the community, within families, and within individuals.

—Lucille McKenzie, CFNHM
Health Promotion Manager, Kenora Chiefs Advisory
Community Member, Grassy Narrows First Nation

Inflammatory Bowel Disease

Inflammatory Bowel Disease (IBD) is a group of conditions affecting the intestines, which help the body digest food and absorb nutrients (39). These conditions involve chronic inflammation of the intestines, causing pain, digestive problems, and other very serious symptoms. Inflammation happens when the immune system identifies something that shouldn't be in the body and tries to fight it. The two most common types of IBD include Crohn's disease and ulcerative colitis.

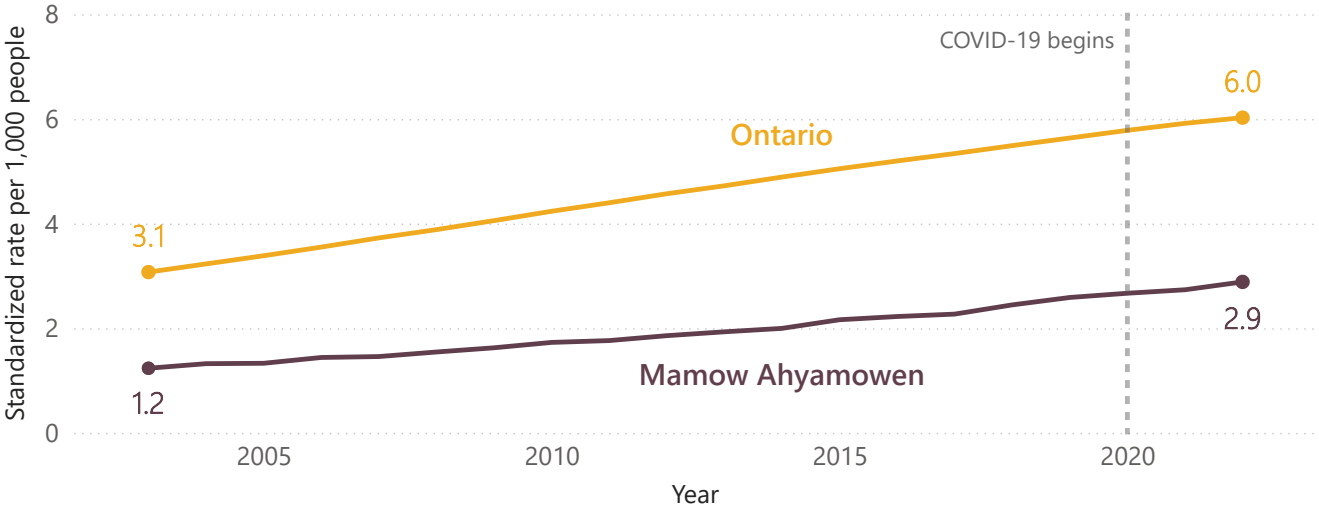
In 2019, the prevalence of inflammatory bowel disease for Mamow Ahyamowen was 2.6 cases per 1,000 people.

On average, this means that **fewer than 1 out of every 10** community members was living with inflammatory bowel disease.

While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of inflammatory bowel disease increased for Mamow Ahyamowen, more than doubling

Graph 61. Prevalence of inflammatory bowel disease over time, 2003-2022



The prevalence of inflammatory bowel disease for Mamow Ahyamowen increased over time, more than doubling from 1.2 cases per 1,000 people in 2003 to 2.9 per 1,000 in 2022. The prevalence for Ontario overall was higher but followed a similar pattern over time, almost doubling from 3.1 cases per 1,000 people in 2003 to 6.0 per 1,000 in 2022.

The incidence of inflammatory bowel disease for Mamow Ahyamowen increased over time, doubling from 0.1 new cases per 1,000 people in 2003 to 0.2 per 1,000 in 2021 (figure not shown). The incidence for Ontario overall was higher but followed a similar pattern over time, increasing from 0.2 new cases per 1,000 people in 2003 to 0.3 per 1,000 in 2021.

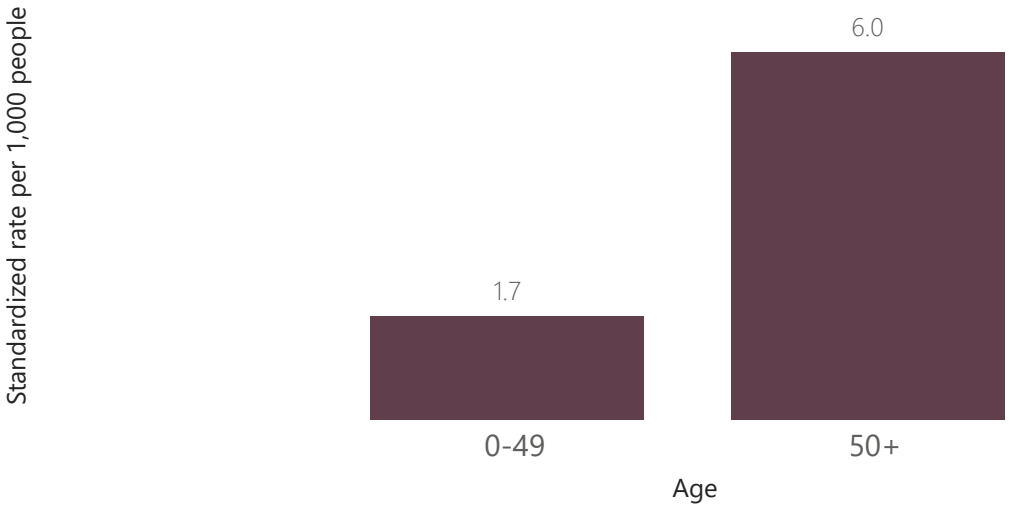
So What?

The increase in incidence that we observed for Mamow Ahyamowen suggests that more community members are being diagnosed with inflammatory bowel disease each year. Based on the increase in prevalence, it could also be that community members with inflammatory bowel disease are living longer or that fewer of them are passing away.

Building on our bathtub analogy (page 22), the water level in the tub is rising. We know that this is partly because more water is flowing from the faucet. It could also be that less water is draining out of the tub.

Prevalence of inflammatory bowel disease was higher for community members aged 50+

Graph 62. Prevalence of inflammatory bowel disease by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of inflammatory bowel disease in 2019 was higher for community members aged 50 and over at 6.0 per 1,000 people. This was 3.5 times that of community members aged 49 and under.

When broken down by sex, the prevalence of inflammatory bowel disease in 2019 was **higher for female community members** compared to males.



3.0 cases per 1,000

2.1 cases per 1,000

What We Heard

Event participants felt that our findings likely underestimate the true number of people living with inflammatory bowel disease, which can be hard to diagnose under the best of circumstances. Gastrointestinal symptoms tend to be brushed off, especially when someone has other health issues that might be considered more pressing. Furthermore, there isn't a specific test that can be used to diagnose inflammatory bowel disease. Instead, health care providers usually recommend a combination of tests and procedures. For people who don't have reliable access to primary care, this means that inflammatory bowel disease might take a long time to diagnose or that it might be missed altogether. Water insecurity, which is an issue in some Mamow Ahyamowen communities, makes diagnosis harder as drinking unsafe water can cause similar symptoms.

Chronic Pancreatitis

Pancreatitis refers to inflammation of the pancreas (40). Chronic pancreatitis is when scar tissue gradually forms in the pancreas, affecting its ability to help digest food and control blood sugar.

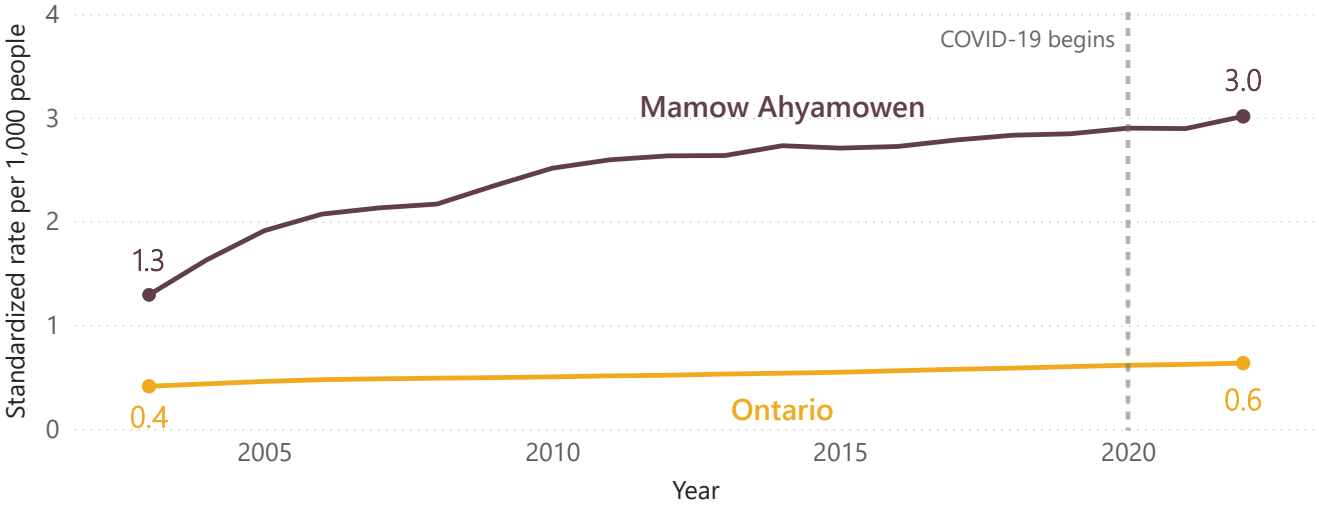
In 2019, the prevalence of chronic pancreatitis for Mamow Ahyamowen was 2.8 cases per 1,000 people.

On average, this means that **fewer than 1 out of every 10** community members was living with chronic pancreatitis.

While it is important to put these rates into perspective, remember that conditions with relatively low prevalence can still have serious impacts on the health and wellbeing of community members.

Prevalence of chronic pancreatitis increased for Mamow Ahyamowen, more than doubling

Graph 63. Prevalence of chronic pancreatitis over time, 2003-2022



The prevalence of chronic pancreatitis for Mamow Ahyamowen increased over time, more than doubling from 1.3 cases per 1,000 people in 2003 to 3.0 per 1,000 in 2022. The prevalence for Ontario overall was much lower and increased a bit more gradually from 0.4 cases per 1,000 people in 2003 to 0.6 per 1,000 people in 2022.

In 2022, the prevalence of chronic pancreatitis for Mamow Ahyamowen was 5 times that of Ontario overall.

The incidence of chronic pancreatitis for Mamow Ahyamowen decreased from 0.4 cases per 1,000 people in 2003 to 0.3 per 1,000 in 2022 (figure not shown). The incidence for Ontario overall was much lower and followed a different pattern over time, staying more stable at 0.1 cases per 1,000 people in both 2003 and 2022.

So What?

The decrease in incidence that we observed for Mamow Ahyamowen suggests that fewer community members are being diagnosed with chronic pancreatitis each year. Together with the increase in prevalence, this could mean that community members with chronic pancreatitis are living longer or that fewer of them are passing away.

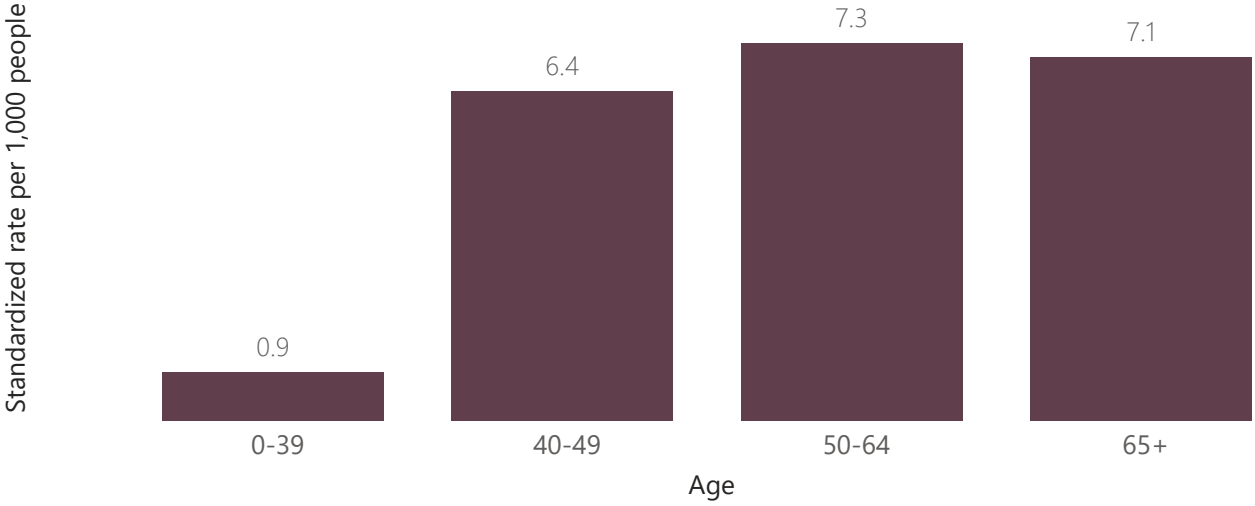
Building on our bathtub analogy (page 22), the water level in the tub is rising even though there's less water flowing from the faucet. This could mean that less water is draining out of the tub.

What We Heard

Event participants noted that pancreatitis is often related to substance use. Sometimes, health care providers mistake the signs and symptoms of pancreatitis as drug-seeking behaviour, which means that the condition often goes undiagnosed and untreated. This is probably more likely to happen to Mamow Ahyamowen community members due to common stereotypes and implicit biases about First Nations people (28).

Prevalence of chronic pancreatitis was highest for community members aged 50+

Graph 64. Prevalence of chronic pancreatitis by age, Mamow Ahyamowen, 2019



When broken down by age, the prevalence of chronic pancreatitis in 2019 was higher in the older age groups. The prevalence was highest for community members aged 50 to 64 and those aged 65 and over, at 7.3 and 7.1 per 1,000 people, respectively.

When broken down by sex, the prevalence of chronic pancreatitis in 2019 was **slightly higher for male community members** compared to females.



2.8 cases per 1,000

3.0 cases per 1,000

Conclusion

This research has produced key takeaways around the chronic conditions affecting Mamow Ahyamowen community members. The stories and community knowledge shared throughout this report also shed light on a few of the many social determinants of health at play. While some of the findings may seem discouraging, we invite you to think of this work as a flashlight. Beyond simply shining a light on the challenges facing our people, we can use these findings to illuminate a path forward. We also hope that many of the stories we have shared work to paint a more balanced picture of community wellbeing, highlighting what's working as well as what's not. We are excited to see how organizations and communities put these findings to use.

While this report looked at each chronic condition separately, the next phase of this project will explore multimorbidity and health service use. Multimorbidity is when someone has more than one chronic condition at a time. By considering how different combinations of chronic conditions impact community members as well as how these community members interact with the health care system, we can come to a deeper and more nuanced understanding of wellbeing.

We hope you will stay with us as we continue this journey. To keep up with our work, please visit mamowahyamowen.ca.

Appendix 1: Participating Communities

Animakee Wa Zhing 37
Anishinaabeg of Naongashiing (Big Island)
Aroland
Asubpeeschoseewagong (Grassy Narrows)
Atikameksheng Anishnawbek
Attawapiskat
Batchewana
Bearskin Lake
Brunswick House
Cat Lake
Chima'aganing (Seine River)
Constance Lake
Couchiching
Deer Lake
Eabametoong
Eagle Lake
Fort Albany
Fort Severn
Garden River
Ginoogaming
Kasabonika Lake
Kashechewan
Keewaywin
Kingfisher Lake
Kitchenuhmaykoosib Inninuwug
Koocheching
Lac La Croix (Gakijiwanong Anishinaabe Nation)
Lac Seul
Long Lake #58
Manidoo Baa Witi Gong (Rainy River)
Marten Falls
Matachewan
Mattagami
McDowell Lake
Mishkeegogamang
Musk-kosiminiziibing (Big Grassy River)
Mississauga
Mitaanjigamiing
MoCreebec
Moose Cree
Muskrat Dam
Naicatchewenin
Naotkamegwanning
Neskantaga
Nibinamik
Nigigoonsiminikaaning
Niisaachewan (Ochiichagwe'Babigo'Ining)
North Spirit Lake

Northwest Angle #33

Ojibway Nation of Saugeen

Ojibways of Onigaming

Peawanuk (Weenusk)

Pikangikum

Poplar Hill

Sachigo Lake

Sagamok

Sandy Lake

Serpent River

Shoal Lake #40

Slate Falls

Wabaseemoong

Wabauskang

Wabigoon Lake

Wapekeka

Washagamis Bay

Wauzhushk Onigum

Wawakapewin

Weagamow (North Caribou Lake)

Webequie

Wunnumin Lake

Appendix 2: Inclusion and Exclusion Criteria

Inclusion and exclusion criteria give detailed information that helps us decide who to include when linking records that are present in both datasets.

We included members of participating Mamow Ahyamowen communities with records in the Indian Register.

However, there were some situations where we were not able to link someone's records even if they met the broader inclusion criteria. This included:

- Records with an invalid ICES Key Number (IKN), which is a unique number used at ICES that is assigned to every person in Ontario with a valid OHIP card (enables researchers to link information across different datasets)
- Records with an invalid birth date (e.g., birth date missing or after index date)
- Records with an invalid death date (e.g., death date before index date)
- Records missing sex
- Records indicating that the person resided outside of Ontario
- Records missing age or with an age greater than 105
- Records indicating that the person had not interacted with the health care system in the preceding 8 years[7]

The index date was January 1st of each year. An index date is the date by which data are evaluated according to inclusion and exclusion criteria.

7 If someone had not interacted with the health care system in 8 years, we assumed that they no longer lived in Ontario. However, it is possible that they could have been accessing care outside of the provincial system while still living in Ontario, particularly for First Nations people.

Appendix 3: Conditon Codes and Criteria

We used the multimorbidity macro derived at ICES for this project (41-59). A macro is a set of computer codes that researchers use to automatically retrieve, organize, and analyze the data they are working with. The multimorbidity macro retrieved data from acquired and derived cohorts, as well as using condition-specific codes from various sources. In addition, we explored several conditions that are not included in the macro at the direction of our Steering Committee, including cirrhosis (60,61) and chronic pancreatitis.

The individual codes and criteria that we used to identify chronic conditions for this project are listed below to help interpret the findings and to allow for comparable work to be completed in the future. We used several types of codes, including those from the Ontario Health Insurance Plan (OHIP) and the International Classification of Diseases (ICD) system. The ICD provides a numbered international medical classification standard. We relied on several versions of this system, which are specified and defined in the tables below.

Table 2: Administrative data codes and criteria used to identify chronic conditions

Condition	Codes or Cohorts			Criteria	Ages
	ICD-9	ICD-10	OHIP		
All mental health or substance use	See Table 4			Those with at least 1 hospitalization, emergency department visit, or outpatient visit with a diagnostic code for any of the mental health and substance use conditions detailed below, including mood and anxiety disorders, substance use disorder, schizophrenia and other psychotic disorders, and other mental health conditions. Excludes dementia, delirium, and other neurocognitive disorders.	All

Condition	Codes or Cohorts			Criteria	Ages
	ICD-9	ICD-10	OHIP		
Arrhythmia	4273	I480, I481	427	Those with 1 of the following: a. at least 1 acute hospitalization for arrhythmia b. at least 2 OHIP diagnostic codes for arrhythmia in a 2-year period	All
Asthma	Cases from ICES-derived cohort: Ontario Asthma Database (ASTHMA)			Those with 1 of the following: a. 1 acute hospital admission with an asthma diagnosis a. 2 OHIP claims with an asthma diagnosis in a 2-year period	All
Cancer	Cases from acquired cohort: Ontario Cancer Registry			All new cases of cancer are registered in the Ontario Cancer Registry by Cancer Care Ontario. Excludes non-melanoma skin cancer.	All
Chronic obstructive pulmonary disease (COPD)	Cases from ICES-derived cohort: Ontario Chronic Obstructive Pulmonary Disease (COPD)			Those with 1 of the following: a. 3 physician claims with a COPD diagnosis within a two-year period b. 1 acute COPD hospitalization	35+
Cirrhosis	See Table 3			Those with 1 of the following: a. at least 1 OHIP code for cirrhosis b. at least 1 hospitalization for cirrhosis AND at least 1 complication of cirrhosis	All
Congestive heart failure	Cases from ICES-derived cohort: Ontario Congestive Heart Failure Database (CHF)			Those with 1 of the following: a. at least 1 hospital admission with a congestive heart failure diagnosis b. an OHIP claim or emergency department record followed within 1 year by a second record with a congestive heart failure diagnosis from any source	40+
Coronary artery disease	411-414	I20, I22-I25	411-414	Those with 1 of the following: a. at least 1 acute hospitalization b. at least 2 OHIP diagnostic codes for coronary artery disease in a 2-year period Excludes acute myocardial infarction (AMI).	All

Condition	Codes or Cohorts			Criteria	Ages
	ICD-9	ICD-10	OHIP		
Dementia	Cases from ICES-derived cohort: Ontario Dementia Database			Those with 1 of the following: a. at least 3 OHIP claims with a dementia diagnosis recorded which were at least 30 days apart in a 2-year period b. at least 1 hospitalization or same day surgery with a dementia diagnosis recorded c. at least 1 Ontario Drug Benefit (ODB) claim with a dementia medication dispensed	40+
Diabetes	Cases from ICES-derived cohort: Ontario Diabetes Database (ODD)			Those with 1 of the following: *Children and Youth (< 18):* a. at least 4 OHIP diabetes diagnostic codes b. at least 1 OHIP procedure code for diabetes in a two-year period *Adults (19+):* a. at least 2 OHIP diabetes diagnostic codes b. at least 1 hospitalization OR at least 1 diabetes drug claim in a 1-year period Excludes gestational diabetes.	All
Heart attack (acute myocardial infarction)	Cases from ICES-derived cohort: Ontario Myocardial Infarction Database (OMID)			Those with both of the following: a. at least 1 acute hospitalization with the most responsible diagnosis of acute myocardial infraction b. no hospitalization for acute myocardial infarction in the preceding year	20+

Condition	Codes or Cohorts			Criteria	Ages
	ICD-9	ICD-10	OHIP		
High blood pressure (hypertension)	Cases from ICES-derived cohort: Ontario Hypertension Database (HYPER)			Those with 1 of the following: a. 1 hospital admission or surgery record with a hypertension diagnosis b. an OHIP claim with a hypertension diagnosis followed by either an OHIP claim or a hospital admission or surgery record with a hypertension diagnosis in a 2-year period Excludes gestational hypertension.	20+
Inflammatory bowel disease (Crohn's and colitis)	Cases from ICES-derived cohort: Ontario Crohn's and Colitis Cohort Database (OCCC)			Those with 1 of the following: *Children and Youth (< 18)* a. OHIP procedure code for a sigmoidoscopy or colonoscopy AND 2 hospital admissions with an inflammatory bowel disease diagnosis, OR 4 OHIP claims or emergency department visits with an inflammatory bowel disease diagnosis in a 3-year period b. if they did NOT have OHIP procedure code for a sigmoidoscopy or colonoscopy, 3 hospital admissions with an inflammatory bowel disease diagnosis OR 7 OHIP claims or emergency department visits with an inflammatory bowel disease diagnosis in a 3-year period c. inflammatory bowel disease diagnosis	All

Condition	Codes or Cohorts			Criteria	Ages
	ICD-9	ICD-10	OHIP		
				Adults (18-64) a. at least 2 years of OHIP eligibility and 5 health contacts (including hospital admissions, OHIP claims, and emergency department visits) with an inflammatory bowel disease diagnosis in a 4-year period b. if they did not have 2 years of OHIP eligibility, 3 hospital admissions, OHIP claims, or emergency department visits with an inflammatory bowel disease diagnosis	
				Older Adults (65+) a. at least 2 years of OHIP eligibility and 5 health contacts (including hospital admissions, OHIP claims, and emergency department visits) with an inflammatory bowel disease diagnosis within a 4-year period AND 1 Ontario Drug Benefit Claim for an inflammatory bowel disease medication b. if they did not have 2 years of OHIP eligibility, 3 hospital admissions, OHIP claims, or emergency department visits with an inflammatory bowel disease diagnosis AND 1 Ontario Drug Benefit Claim for an inflammatory bowel disease medication	
Kidney (renal) failure	403, 404, 584, 585, 586, v451	N17-N19, T824, Z492, Z992	403, 404, 584, 585, 586, v451	Those with 1 of the following: a. at least 1 acute hospitalization for renal failure b. at least 2 OHIP diagnostic codes for renal failure in a 2-year period	All
Mood and anxiety disorders	See Table 4			Those with at least 1 hospitalization, emergency department visit, or outpatient visit with a diagnostic code for mood or anxiety disorders. Mood disorders include bipolar disorder, depression, and other.	All

Condition	Codes or Cohorts			Criteria	Ages
	ICD-9	ICD-10	OHIP		
Osteoarthritis (and other types of arthritis)	715, 274, 710, 711, 716, 718, 720, 727, 728, 729, 739	M15-19, M00-03, M07, M10-14, M20-24, M25, M30-36, M65-69, M7	715, 274, 710, 711, 716, 718, 720, 727, 728, 729, 739	Those with 1 of the following: a. at least 1 acute hospitalization for osteoarthritis or other arthritis b. at least 2 OHIP diagnostic codes for osteoarthritis or other arthritis in a 2-year period Excludes rheumatoid arthritis.	All
Osteoporosis	733	M81, M82	733	Those with 1 of the following: a. at least 1 acute hospitalization for osteoporosis b. at least 2 OHIP diagnostic codes for osteoporosis in a 2-year period	All
Other mental health conditions	See Table 4			Those with at least 1 hospitalization, emergency department visit, or outpatient visit with a diagnostic code for other mental health conditions. This category includes mental health conditions that were not categorized as mood and anxiety disorders, schizophrenia and other psychotic disorders, or substance use disorders. Examples include intentional self-injury, eating disorders, and most types of personality disorders.	All
Pancreatitis, chronic	5771	K860, K861		Those with 1 of the following: a. at least 1 hospitalization with a chronic pancreatitis diagnosis b. at least 1 emergency department visit with a chronic pancreatitis diagnosis in a 1-year period	All
Schizophrenia and other psychotic disorders	See Table 4			Those with at least 1 hospitalization, emergency department visit, or outpatient visit with a diagnostic code for schizophrenia and other psychotic disorders.	All

Condition	Codes or Cohorts			Criteria	Ages
	ICD-9	ICD-10	OHIP		
Rheumatoid arthritis	Cases from ICES-derived cohort: Ontario Rheumatoid Arthritis Database (ORAD)			Those with 1 of the following: a. at least 1 hospitalization b. at least 3 OHIP claims for rheumatoid arthritis over a 2-year period, with at least 1 claim by a musculoskeletal specialist	15+
Stroke	430-434, 436	I60-I64	430-434, 436	Those with 1 of the following: a. at least 1 acute hospitalization b. at least 2 OHIP diagnostic codes for stroke in a 2-year period Excludes transient ischemic attacks.	All
Substance use disorder	See Table 4			Those with at least 1 hospitalization, emergency department visit, or outpatient visit with a diagnostic code for substance use disorder. This includes alcohol, opioids, and other drugs.	All

OHIP = Ontario Health Insurance Plan, ICD-9 = International Classification of Diseases (9th Revision), ICD-10 = International Classification of Disease (10th Revision)

Table 3: Administrative data codes used to identify cirrhosis

Criteria	Type	Codes
Physician visit	OHIP	571
Hospital diagnostic	ICD-9	456.1, 571.2, 571.5
	ICD-10	I85.9, I98.2, K70.3, K71.7, K74.6
Complications of cirrhosis	ICD-9	155.0, 572.2, 572.3, 572.4, 456.0, 456.2, 782.4, 789.5, V427
	ICD-10	C22.0, C22.9, 81703,81803, I85.0, I86.4, I98.20, I98.3, K721, K729, K76.6, K76.7, R17, R18, T86.400, T86.401, Z76804, Z944
	CCP	1006, 6691,62.40, 62.41, 62.49
	CCI	1.NA.13.BA-FA, 1.NA.13.BA-X7, 1.NA.13.BA-BD, 1.KQ.76GP-NR, 1.OT.52. HA,1.OA.59, 1.OA.85
	OHIP	155, J057, J069, Z591, S294, S295, S265, S266

OHIP = Ontario Health Insurance Plan, ICD-9 = International Classification of Diseases (9th Revision), ICD-10 = International Classification of Disease (10th Revision), CCP = Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures, CCI = Canadian Classification of Health Interventions

Table 4: Administrative data codes used to identify mental health and substance use conditions

Condition	Source	Period	Type	Codes[8]
All mental health and substance use conditions	DAD/NACRS	All years	ICD-10-CA	DX10CODE1= F06-F99 or DX10CODE2-DX10CODE10 = X60-X84, Y10-Y19, Y28 when DX10CODE1 ne F06-F99
	OMHRS	Prior to 2019/20	ICD-9-CM	Any diagnosis (including missing, except for 290.x, 294.x [dementia] in primary diagnosis) Prior to 2016/17: If Provisional = 2, then exclude. From 2016/17-2018/19: If Provisional = 17, then exclude.
		2019/20 onward	ICD-10-CM	Any diagnosis (including missing, except for neurocognitive disorders in primary diagnosis) If Provisional = 17, then exclude.
	OHIP	All years	OHIPDX	295, 297, 298, 296, 300, 311, 291, 292, 303, 304, 301, 302, 306, 307, 309

8 For DAD, NACRS, and OMHRS records, unless otherwise specified, the diagnostic code was ascertained from the primary diagnostic field (i.e., main or most responsible diagnosis). In OMRHS, if the primary discharge diagnosis was missing, the primary provisional discharge diagnosis was used.

Condition	Source	Period	Type	Codes
Anxiety disorders	DAD/NACRS	All years	ICD-10-CA	F40.x, F41.x, F42.x, F43.x, F48.8, F48.9, F93.1, F93.2
	OMHRS	Prior to 2019/20	ICD-9-CM	300, 300.0x, 300.2x, 300.3x, 308.3x, 309.0x, 309.24, 309.28, 309.3x, 309.4x, 309.8x, 309.9x. Prior to 2016/17: Provisional = 7, 15 From 2016/17-2018/19: Provisional = 5, 6, 7
		2019/20 onward	ICD-10-CM	F06.4x, F06.8x, F40.0x, F40.1x, F40.2x, F41.0x, F41.1x, F41.8x, F41.9x, F42.2x, F42.3x, F42.4x, F42.8x, F42.9x, F43.0x, F43.1x, F43.2x, F43.8x, F43.9x, F45.2x, F63.3x, F93.0x, F94.0x, F94.1x, F94.2x Provisional = 5, 6, 7
	OHIP	All years	OHIPDX	300
Mood disorders	DAD/NACRS	All years	ICD-10-CA	F30.x, F31.x, F32.x, F33.x, F34.x, F38.x, F39.x, F53.0
	OMHRS	Prior to 2019/20	ICD-9-CM	296.x, 300.4x, 301.13, 311.x. Prior to 2016/17: Provisional = 6 From 2016/17-2018/19: Provisional = 3, 4
		2019/20 onward	ICD-10-CM	F06.3x, F31.x, F32.x, F33.x, F34.x. Provisional = 3, 4
	OHIP	All years	OHIPDX	296, 311
Other mental health conditions	This category includes any mental health diagnoses that were not coded as anxiety disorders, mood disorders, schizophrenia and other psychotic disorders, or substance use disorder as per the definitions in this table.			

Condition	Source	Period	Type	Codes
Schizophrenia and other psychotic disorders	DAD/NACRS	All years	ICD-10-CA	F20.x (excluding F20.4), F22.x, F23.x, F24.x, F25.x, F28.x, F29.x, F53.1
	OMHRS	Prior to 2019/20	ICD-9-CM	295.x, 297.x, 298.x Prior to 2016/17: Provisional = 5 From 2016/17-2018/19: Provisional = 2
		2019/20 onward	ICD-10-CM	F06.0x, F06.1x, F06.2x, F20.81, F20.9x, F22.x, F23.x, F25.x, F28.x, F29.x. Provisional = 2
	OHIP	All years	OHIPDX	295, 297, 298
Substance use disorder	DAD/NACRS	All years	ICD-10-CA	F10.x-F19.x, F55.x
	OMHRS	Prior to 2019/20	ICD-9-CM	291.x (excluding 291.82), 292.x (excluding 292.85), 303.x, 304.x, 305.x. Prior to 2016/17: Provisional = 4 From 2016/17-2018/19: Provisional = 16
		2019/20 onward	ICD-10-CM	291.x (excluding 291.82), 292.x (excluding 292.85), 303.x, 304.x, 305.x. Prior to 2016/17: Provisional = 4 From 2016/17-2018/19: Provisional = 16
	OHIP	All years	OHIPDX	291, 292, 303, 304

DAD = Discharge Abstract Database, ICD-9-CM = International Classification of Diseases (9th Revision, Clinical Modification), ICD-10-CA = International Classification of Diseases (10th Revision, Canada), ICD-10-CM = International Classification of Diseases (10th Revision, Clinical Modification, NACRS = National Ambulatory Care Reporting System, OHIP = Ontario Health Insurance Plan, OHIPDX = Ontario Health Insurance Plan Diagnosis Code

Appendix 4: Data Sources

Table 5: Description of data sources

Source	Type	Description
Discharge Abstract Database (DAD)	Health administrative database	Compiled by the Canadian Institute for Health Information. Contains administrative, clinical (diagnoses and procedures/ interventions), demographic, and administrative information for all admissions to acute care hospitals, rehab, chronic, and day surgery institutions in Ontario. Consecutive records can be linked together to form 'episodes of care' among hospitals to which patients have been transferred after their initial admission.
Same Day Surgery Database (SDS)	Health administrative database	Compiled by the Canadian Institute for Health Information. Contains administrative, clinical (diagnoses and procedures), demographic, and administrative information for all patient visits made to day surgery institutions in Ontario. Main data elements include patient demographics, clinical data (diagnoses, procedures, physician), administrative data (institution/hospital number, etc.), financial data, service-specific data elements for day surgery and emergency.
National Ambulatory Care Reporting System (NACRS)	Health administrative database	Compiled by the Canadian Institute for Health Information. Contains administrative, clinical (diagnoses and procedures), demographic, and administrative information for all patient visits made to hospital - and community-based ambulatory care centres (emergency departments, day surgery units, hemodialysis units, and cancer care clinics). Records can be linked with other data sources, such as DAD and OMHRS, to identify transitions to other care settings, such as inpatient acute care or psychiatric care.

Source	Type	Description
Ontario Health Insurance Plan Claims Database (OHIP)	Health administrative database	Contains information on inpatient and outpatient services provided to Ontario residents eligible for the province's publicly funded health insurance system by fee-for-service health care practitioners (primarily physicians) and "shadow billings" for those paid through non-fee-for-service payment plans. Main data elements include patient and physician identifiers (encrypted), code for service provided, date of service, associated diagnosis, and fee paid.
Ontario Drug Benefits Claims (ODB)	Health administrative database	Contains prescription medication claims for those covered under the provincial drug program, mainly: those aged 65 years and older, nursing home residents, patients receiving services under the Ontario Home Care program, those receiving social assistance, and residents eligible for specialized drug programs. Main data elements include drug identifier, quantity, number of days supplied, date dispensed, cost, and patient, pharmacy and physician identifiers.
Ontario Mental Health Reporting System (OHMRS)	Health administrative database	Compiled by the Canadian Institute for Health Information. Contains administrative, clinical (diagnoses and procedures), demographic, and administrative information for all admissions to adult designated inpatient mental health beds. This includes beds in general hospitals, provincial psychiatric facilities, and specialty psychiatric facilities. Clinical assessment data is ascertained using the Resident Assessment Instrument for Mental Health (RAI-MH), but different amounts of information are collected using this instrument depending on the length of stay in the mental health bed. Multiple assessments may occur during the length of a mental health admission.
Registered Persons Database Files (RPDB)	Population based database	Contains basic demographic information (age, sex, location of residence, date of birth, and date of death for deceased individuals) for those issued an Ontario health insurance number. Also indicates the time periods for which an individual was eligible to receive publicly funded health insurance benefits and the best-known postal code for each registrant on July 1st of each year.
Postal Code Conversion File (PCCF)	Population based database	Links to postal codes within a given cohort and determines other census geographic identifiers such as dissemination/ enumeration area, census division, longitude and latitude, urban versus rural flag, and neighbourhood income quintile.

Source	Type	Description
Ontario Cancer Registry (OCR)	Health administrative database	Compiled by Cancer Care Ontario. Contains information on all Ontario residents who have been newly diagnosed with cancer (“incidence”) or who have died of cancer (“mortality”). All new cases of cancer are registered, except non-melanoma skin cancer.
Ontario Crohn’s and Colitis Cohort Database (OCCC)	Health administrative database	Includes all Ontario patients who were identified with Crohn’s disease or ulcerative colitis, collectively referred to as inflammatory bowel disease (IBD), aged 0-105 years.
Indian Register (COVID Specific Cohort) (IR-C19)	Population based database	Includes all registered members of First Nations in Canada. Note: only people with valid Ontario health cards who could be linked to the RPDB were included.

Appendix 5: Strengths and Limitations

Strengths

Pooling Data

A major strength of our project lies in the size of its population. By pooling data from communities across the Alliance, we were able to explore indicators using methods that may not have been viable with smaller population sizes.

Health Administrative Data

Similarly, our use of health administrative data allowed us to produce population-based estimates that would not have been feasible through self-report or other research methods. Administrative data is cost-effective, reduces the need for new data collection, and delivers critical evidence to inform health policies, programs, and resource allocation tailored to the unique needs of First Nations communities.

Governance

Our decisions were guided by a Steering Committee of individuals with rich experience living and/or working in participating communities and regions, which ensured that the findings would be relevant and meaningful. Take, for example, the way we worked with the datasets at ICES. Researchers at the organization who study chronic conditions usually use a specific macro, which is an automated series of actions that can be used to generate findings quickly and accurately. While this macro has been validated for use in the general population, we believed that the unique circumstances of First Nations in northern Ontario would likely necessitate some changes. In this vein, the Steering Committee identified two chronic conditions that were not included in the ICES macro that were important for them to learn about: cirrhosis and chronic pancreatitis.

Standardization

Another strength of our project lies in its approach to standardization, a statistical technique that is used to correct for age and sex differences between populations. This is especially important when populations are very different in terms of age and when the health outcome being explored varies by age. Without standardization, it can be hard to know whether the differences between populations are true or whether they are just a reflection of different age structures.

When standardization is used in Indigenous health research, the non-Indigenous population is often used as the reference population, meaning that the Indigenous population must be statistically adjusted (62). Doing so feeds into deficit-based narratives surrounding Indigenous health and frames Indigenous populations as "Other". This also means that data are no longer a true reflection of what's going on in the Indigenous population—they are merely hypothetical—which is problematic when data are being used for planning and evaluation. We used the Mamow Ahyamowen population as our reference population in order to change this narrative and to produce findings that would be meaningful for knowledge users. This means that we adjusted the Ontario overall population to the Mamow Ahyamowen population for comparison.

Limitations

Community Membership

Our project used the Indian Register (IR) to pinpoint members of Mamow Ahyamowen communities. The IR is an imperfect registry rooted in a colonial system, only including those registered as Status Indians as defined in the Indian Act (63). This means that we were unable to include community members who do not qualify for status or those who choose not to register. Furthermore, there is often a delay between when a child is born and when they are registered in the IR, meaning that our project may undercount young children.

Data Gaps

Health administrative data, by definition, relies on people being able to access the health care system. This reliance can pose limitations in several situations. For example, only people who were found in both the IR and the Registered Persons Data Base (RPDB) were included in this project because data at ICES are linked using an identifier that is generated from OHIP cards. This disproportionately affects First Nations people and veterans with alternative federal health coverage.

We did not have access to data on Non-Insured Health Benefits (NIHB) or federally funded nursing stations, meaning that community members who rely on these services may be underrepresented.

Similarly, we did not access health administrative data from other provinces, meaning that community members who travel to neighbouring provinces such as Manitoba for health care may be excluded. Similarly, we did not have access to data from Aboriginal Health Access Centers or Community Health Centres. Finally, we did not have access to data on people who are incarcerated, which is relevant given the overrepresentation of Indigenous people in the corrections system (64).

ICES-Derived Cohorts

Some of the conditions were identified using ICES-derived cohorts. These are datasets that have been created by ICES and use validated algorithms to pinpoint people with specific conditions. While these algorithms generally use a combination of hospital, emergency department, and outpatient data, some involve specific types of interactions with the health care system. For example, someone may be included in a cohort if they fill a prescription related to the condition through the Ontario Drug Benefit program. If people are not eligible for this program or use other programs to obtain medication, such as NIHB, they might be excluded. Similarly, some cohorts have specific criteria around how often people interact with the health care system (e.g., at least two visits) and with whom (e.g., specific type of specialist) over a defined period (e.g., within two years). People living in rural or remote settings—with limited access to specialist care or where it may be more challenging to have multiple visits over a relatively short period of time—may be more likely to be excluded from these cohorts. Furthermore, the algorithms themselves are generally validated in urban hospital settings in southern Ontario and may not reflect the experiences of people living in northern communities. As such, our findings may underestimate the prevalence of certain conditions.

Population Size

While pooling data from communities across the Alliance does give us a larger population to work with, it is still relatively small. Small population sizes can make data unstable, meaning that seemingly minor changes in individual data points can lead to big differences in the results. As such, it is important to interpret the results with caution. Furthermore, it is always best to avoid relying on a single source of information. For these reasons, we have also included knowledge from community members and staff from the organizations who serve them alongside the data (see "What we heard" textboxes).

Racism and Trauma

Health administrative data are limited in their ability to explore trauma, particularly in Indigenous populations. While we included some conditions related to trauma and reactions to stress under mood and anxiety disorders, the relevant administrative codes have been applied inconsistently across databases and over time. Additionally, there are no administrative codes that comprehensively

account for experiences such as intimate partner violence or intergenerational trauma, meaning that we were unable to explore these through this project.

Similarly, health administrative data cannot be used by itself to explore the relationship between racism and wellbeing. In fact, it is also important to keep in mind that, "[a]dministrative data are usually collected routinely by hospitals, pharmacies, laboratories, and health authorities, which are products of institutional oppression and colonialism, and thus the data reflect the structural biases inherent in those systems" (65).

Impact of COVID-19

Finally, it is important to consider specific limitations associated with our findings for 2020 to 2022. During this time, many people were not able to access health care services due to restrictions associated with the COVID-19 pandemic, meaning that they may not have been picked up in the datasets we used for this project. This is particularly relevant for conditions that do not typically require immediate care, such as osteoarthritis, osteoporosis, and inflammatory bowel disease. These findings should be interpreted with caution.

References

1. Mamow Ahyamowen. Learning from Our Ancestors: Mortality Experience of First Nations in Northern Ontario. 2020. Available from: https://mamowahyamowen.ca/wp-content/uploads/2020/10/Mamow-Ahyamowen-UPDATED-March-2020-4.pdf

2. Hayward A, Wodtke L, Craft A, Robin T, Smylie J, McConkey S, et al. Addressing the need for indigenous and decolonized quantitative research methods in Canada. SSM Popul Health. 2021 Sep 1;15:100899.

3. National Institute of Arthritis and Musculoskeletal and Skin Diseases. Bone Health and Osteoporosis: What It Means to You. 2019. Available from: https://www.niams.nih.gov/health-topics/surgeon-generals-report-bone-health-and-osteoporosis-what-it-means-you

4. Yaseen K. Merck Manual Consumer Version. 2024. Osteoarthritis (OA). Available from: https://www.merckmanuals.com/en-ca/home/bone-joint-and-muscle-disorders/joint-disorders/osteoarthritis-oa?query=osteoarthritis

5. Bolster MB. Merck Manual Consumer Version. 2023. Osteoporosis. Available from: https://www.merckmanuals.com/en-ca/home/bone-joint-and-muscle-disorders/osteoporosis/osteoporosis?query=osteoporosis

6. Yaseen K. Merck Manual Consumer Version. 2024. Rheumatoid Arthritis (RA). Available from: https://www.merckmanuals.com/en-ca/home/bone-joint-and-muscle-disorders/joint-disorders/rheumatoid-arthritis-ra

7. National Institute of Arthritis and Musculoskeletal and Skin Diseases. Rheumatoid Arthritis. 2022. Available from: https://www.niams.nih.gov/health-topics/rheumatoid-arthritis

8. Essouma M, Noubiap JJN. Is air pollution a risk factor for rheumatoid arthritis? J Inflamm. 2015 Jul 30;12(1):48.

9. Adami G, Pontalti M, Cattani G, Rossini M, Viapiana O, Orsolini G, et al. Association between long-term exposure to air pollution and immune-mediated diseases: A population-based cohort study. RMD Open. 2022;8(1):e002055.

10. Gumtorntip W, Kasitanon N, Louthrenoo W, Chattipakorn N, Chattipakorn SC. Potential roles of air pollutants on the induction and aggravation of rheumatoid arthritis: From cell to bedside studies. Environmental Pollution. 2023;(334):122181.

11. Kronzer VL, Yang Y, Roul P, Crooks JL, Crowson CS, Davis JM, et al. Associations of Fire Smoke and

Other Pollutants With Incident Rheumatoid Arthritis and Rheumatoid Arthritis–Associated Interstitial Lung Disease. Arthritis & Rheumatology. 2025;77(7):808–16.

12. Mayo Clinic Staff. Mayo Clinic. 2024. High blood pressure (hypertension). Available from: https://www.mayoclinic.org/diseases-conditions/high-blood-pressure/symptoms-causes/syc-20373410

13. Bakris GL. Merck Manual Consumer Version. 2023. High Blood Pressure. Available from: https://www.merckmanuals.com/en-ca/home/heart-and-blood-vessel-disorders/high-blood-pressure/high-blood-pressure?query=hypertension

14. Editorial Staff. Merck Manual Consumer Version. 2023. Overview of Coronary Artery Disease (CAD). Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-heart-and-blood-vessel-disorders/coronary-artery-disease/overview-of-coronary-artery-disease-cad?query=coronary%20artery%20disease

15. Mitchell LB. Merck Manual Consumer Version. 2024. Overview of Abnormal Heart Rhythms. Available from: https://www.merckmanuals.com/en-ca/home/heart-and-blood-vessel-disorders/abnormal-heart-rhythms/overview-of-abnormal-heart-rhythms

16. Merck Manual Consumer Version. Heart Failure. 2024. Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-heart-and-blood-vessel-disorders/heart-failure/heart-failure?query=congestive%20heart%20failure

17. Editorial Staff. Merck Manual Consumer Version. 2023. Stroke. Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-brain-spinal-cord-and-nerve-disorders/stroke-cva/stroke?query=stroke

18. Editorial Staff. Merck Manual Consumer Version. 2023. Heart Attack (Myocardial Infarction). Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-heart-and-blood-vessel-disorders/coronary-artery-disease/heart-attack?query=acute%20myocardial%20infarction%20(mi)

19. Mallach G, Sun LS, McKay M, Kovesi T, Lawlor G, Kulka R, et al. Indoor air quality in remote first nations communities in Ontario, Canada. PLoS One. 2023 Nov 1;11(18):e0294040.

20. Editorial Staff. Merck Manual Consumer Version. 2023. Asthma. Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-lung-and-airway-disorders/asthma/asthma?query=asthma

21. Editorial Staff. Merck Manual Consumer Version. 2023. Chronic Obstructive Pulmonary Disease (COPD). Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-lung-and-airway-disorders/chronic-obstructive-pulmonary-disease-copd/chronic-obstructive-pulmonary-disease-copd?query=copd

22. Gale RP. Merck Manual Consumer Version. 2024. Overview of Cancer. Available from: https://www.merckmanuals.com/en-ca/home/cancer/overview-of-cancer/overview-of-cancer?query=cancer

23. World Health Organization. Mental health. Available from: https://www.who.int/health-topics/mental-health#tab=tab_1

24. Editorial Staff. Merck Manual Consumer Version. 2024. Overview of Mental Illness. Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-mental-health-disorders/overview-of-mental-health-care/overview-of-mental-illness?query=mental%20illness

25. Staff. Canadian Mental Health Association. 2013. Mood Disorders. Available from: https://bc.cmha.ca/documents/mood-disorders-2/

26. American Psychiatric Association. What are Anxiety Disorders? 2023. Available from: https://www.psychiatry.org/patients-families/anxiety-disorders/what-are-anxiety-disorders

27. Torrise B. American Psychiatric Association. Addiction and Substance Use Disorders. Available from: https://www.psychiatry.org/patients-families/addiction-substance-use-disorders

28. Allan B, Smylie J. First Peoples, second class treatment: The role of racism in the health and well-being of Indigenous peoples in Canada. Toronto, ON; 2015. Available from: http://www.wellesleyinstitute.com/wp-content/uploads/2015/02/Summary-First-Peoples-Second-Class-Treatment-Final.pdf

29. Centre for Addiction and Mental Health. Psychosis. Available from: https://www.camh.ca/en/health-info/mental-illness-and-addiction-index/psychosis

30. National Institute of Diabetes and Digestive and Kidney Diseases. The Urinary Tract & How It Works. Available from: https://www.niddk.nih.gov/health-information/urologic-diseases/urinary-tract-how-it-works

31. National Institute of Diabetes and Digestive and Kidney Diseases. Diabetic Kidney Disease. 2017. Available from: https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/diabetic-kidney-disease

32. United States Centres for Disease Control and Prevention. Diabetes Basics. 2024. Available from: https://www.cdc.gov/diabetes/about/index.html

33. Indigenous Services Canada. Diabetes. 2021. Available from: https://www.sac-isc.gc.ca/eng/1569960595332/1569960634063

34. Malkina A. Merck Manual Consumer Version. 2023. Chronic Kidney Disease. Available from: https://www.merckmanuals.com/en-ca/home/kidney-and-urinary-tract-disorders/kidney-failure/chronic-kidney-disease

35. Merck Manual Consumer Version. Acute Kidney Failure. 2023. Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-kidney-and-urinary-tract-disorders/kidney-failure/acute-kidney-failure?query=kidney%20failure

36. Editorial Staff. Merck Manual Consumer Version. 2024. Dementia. Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-brain-spinal-cord-and-nerve-disorders/dementia/dementia?query=dementia

37. National Institute of Diabetes and Digestive and Kidney Diseases. Your Digestive System & How it Works. 2017. Available from: https://www.niddk.nih.gov/health-information/digestive-diseases/digestive-system-how-it-works

38. Editorial Staff. Merck Manual Consumer Version. 2023. Cirrhosis of the Liver. Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-liver-and-gallbladder-disorders/fibrosis-and-cirrhosis-of-the-liver/cirrhosis-of-the-liver?query=cirrhosis

39. Walfish AE, Companioni RAC. Merck Manual Consumer Version. 2023. Overview of Inflammatory

Bowel Disease (IBD). Available from: https://www.merckmanuals.com/en-ca/home/digestive-disorders/inflammatory-bowel-diseases-ibd/overview-of-inflammatory-bowel-disease-ibd?query=inflammatory%20bowel%20disease%20(ibd),%20overview

40. Editorial Staff. Merck Manual Consumer Version. 2024. Chronic Pancreatitis. Available from: https://www.merckmanuals.com/en-ca/home/quick-facts-digestive-disorders/pancreatitis/chronic-pancreatitis?query=pancreatitis,%20chronic

41. Austin PC, Daly PA, Tu J V. A multicenter study of the coding accuracy of hospital discharge administrative data for patients admitted to cardiac care units in Ontario. Am Heart J. 2002;144(2):290–6.

42. Widdifield J, Bernatsky S, Paterson JM, Tu K, Ng R, Thorne JC, et al. Accuracy of Canadian health administrative databases in identifying patients with rheumatoid arthritis: A validation study using the medical records of rheumatologists. Arthritis Care Res. 2013;65(10):1582–91.

43. Gershon AS, Wang C, Guan J, Vasilevska-Ristovska J, Cicutto L, To T. Identifying individuals with physician diagnosed COPD in health administrative databases. COPD: Journal of Chronic Obstructive Pulmonary Disease. 2009;6(5):388–94.

44. Schultz SE, Rothwell DM, Chen Z, Tu K. Identifying cases of congestive heart failure from administrative data: a validation study using primary care patient records. 2013;33(3):160–6.

45. Liisa Jaakkimainen R, Bronskill SE, Tierney MC, Herrmann N, Green D, Young J, et al. Identification of physician-diagnosed Alzheimer's disease and related dementias in population-based administrative data: A validation study using family physicians' electronic medical records. Journal of Alzheimer's Disease. 2016 Aug 23;54(1):337–49.

46. Hux JE, Flintoft V, Ivis F, Bica A. Diabetes in Ontario: Determination of prevalence and incidence using a validated administrative algorithm. Diabetes Care. 2002 Mar;3(25):512–6.

47. Tu K, Campbell NR, Chen ZL, Cauch-Dudek KJ, Mcalister FA. Accuracy of administrative databases in identifying patients with hypertension. Open Medicine. 2007;1(1):e18-8e26.

48. Benchimol EI, Guttmann A, Griffiths AM, Rabeneck L, Mack DR, Brill H, et al. Increasing incidence of paediatric inflammatory bowel disease in Ontario, Canada: Evidence from health administrative data. Gut. 2009 Nov;58(11):1490–7.

49. Benchimol EI, Guttmann A, Mack DR, Nguyen GC, Marshall JK, Gregor JC, et al. Validation of international algorithms to identify adults with inflammatory bowel disease in health administrative data from Ontario, Canada. J Clin Epidemiol. 2014;67(8):887–96.

50. Koné Pefoyo AJ, Bronskill SE, Gruneir A, Calzavara A, Thavorn K, Petrosyan Y, et al. The increasing burden and complexity of multimorbidity. BMC Public Health. 2015 Dec 1;15(1):1–11.

51. Gruneir A, Bronskill SE, Maxwell CJ, Bai YQ, Kone AJ, Thavorn K, et al. The association between multimorbidity and hospitalization is modified by individual demographics and physician continuity of care: A retrospective cohort study. BMC Health Serv Res. 2016 Apr 27;16(1).

52. Lane NE, Maxwell CJ, Gruneir A, Bronskill SE, Wodchis WP. Absence of a Socioeconomic Gradient in Older Adults' Survival with Multiple Chronic Conditions. EBioMedicine. 2015 Dec 1;2(12):2094–100.

53. Mondor L, Maxwell CJ, Bronskill SE, Gruneir A, Wodchis WP. The relative impact of chronic conditions and multimorbidity on health-related quality of life in Ontario long-stay home care clients. Quality of Life Research. 2016;25(10):2619–32.

54. Thavorn K, Maxwell CJ, Gruneir A, Bronskill SE, Bai Y, Koné Pefoyo AJ, et al. Effect of socio-demographic factors on the association between multimorbidity and healthcare costs: A population-based, retrospective cohort study. BMJ Open. 2017 Oct 1;7(10).

55. Mondor L, Maxwell CJ, Hogan DB, Bronskill SE, Gruneir A, Lane NE, et al. Multimorbidity and healthcare utilization among home care clients with dementia in Ontario, Canada: A retrospective analysis of a population-based cohort. PLoS Med. 2017 Mar 1;14(3).

56. Petrosyan Y, Bai YQ, Koné Pefoyo AJ, Gruneir A, Thavorn K, Maxwell CJ, et al. The Relationship between Diabetes Care Quality and Diabetes-Related Hospitalizations and the Modifying Role of Comorbidity. Can J Diabetes. 2017 Feb 1;41(1):17–25.

57. Rosella L, Kornas K, Huang A, Bornbaum C, Henry D, Wodchis WP. Accumulation of chronic conditions at the time of death increased in Ontario from 1994 to 2013. Health Aff. 2018 Feb 1;37(3):464–72.

58. Mondor L, Cohen D, Khan AI, Wodchis WP. Income inequalities in multimorbidity prevalence in Ontario, Canada: A decomposition analysis of linked survey and health administrative data. Int J Equity Health. 2018 Jun 26;17(1).

59. Gershon AS, To T, Wang C, Guan Msc J, Vasilevska-Ristovska J, Cicutto L, et al. Identifying patients with physician-diagnosed asthma in health administrative databases. Can Respir J. 2009;16(16):183–8.

60. Lapointe-Shaw L, Georgie F, Carlone D, Cerocchi O, Chung H, Dewit Y, et al. Identifying cirrhosis, decompensated cirrhosis and hepatocellular carcinoma in health administrative data: A validation study. PLoS One. 2018 Aug 1;13(8).

61. Philip G, Djerboua M, Carlone D, Flemming JA. Validation of a hierarchical algorithm to define chronic liver disease and cirrhosis etiology in administrative healthcare data. PLoS One. 2020 Feb 1;15(2):30229218.

62. Thurber KA, Thandrayen J, Maddox R, Barrett EM, Walker J, Priest N, et al. Reflection on modern methods: Statistical, policy and ethical implications of using age-standardized health indicators to quantify inequities. Int J Epidemiol. 2022 Feb 1;51(1):324–33.

63. Walker JD, Pyper E, Jones CR, Khan S, Chong N, Legge D, et al. Unlocking First Nations health information through data linkage. Int J Popul Data Sci. 2018 Jan 10;3(1).

64. Robinson P, Small T, Chen A, Irving M. Over-representation of Indigenous persons in adult provincial custody, 2019/2020 and 2020/2021. 2023. Available from: https://www150.statcan.gc.ca/n1/pub/85-002-x/2023001/article/00004-eng.htm

65. Katz A, Freier A. Recognition of inherent biases in administrative data. Canadian Family Physician. 2022 Dec 1;68(12):933–4.

